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AVIAN MALARIA STUDIES, I

PROPHYLACTIC PLASMOCHIN IN INOCULATED AVIAN MALARIA [1]

By PAUL F. RUSSELL

Of the International Health Division, Rockefeller Foundation

TWENTY TEXT FIGURES

INTRODUCTION

The drug plasmochin, sometimes spelled plasmoquine, was developed in Germany in the Elberfeld laboratories of the I. G. Farbenindustrie in 1926 by the chemists Hörlein,(65, 66) Schulemann, Wingler, and Schönhofer(158) working in close coöperation with Roehl,(149, 151) who used canaries as his experimental animals. In the five years since then a great deal of attention has been given this synthetic product in many laboratories throughout the world. In the accompanying bibliography are listed 194 plasmochin references and the list is not complete as to Continental and South American periodicals. It is rather remarkable that among these numerous publications there appear to be only three that refer to the possibility of using plasmochin to prevent malaria infection in man or birds.

[1] In the examination of blood smears in the experiments reported in parts I to IV of this series the author was assisted by Misses Amparo Capistrano and Filomena Villacorta, microscopists on the staff of malaria investigations of which the author is chief. This organization is supported by the Bureau of Science, Manila, in coöperation with the International Health Division of the Rockefeller Foundation. The experiments were done at the Bureau of Science. This article was submitted for publication February 17, 1931.

Hegner and Manwell(60) by administering plasmochin to birds in daily oral doses of 1.5 milligrams kept the blood of one bird free from parasites for forty days after inoculation "with one possible exception." Daily oral doses of 1.0 and 0.5 milligram for five days after a single inoculation did not prevent the appearance of parasites in the blood of birds.

Fischer(48) reported using plasmochin as a prophylactic drug in man. He gave plasmochin to the crew of a ship calling at West African river ports, and although he had 15 per cent malaria morbidity, he contrasts this with 30 per cent on two similar ships. Ejercito(44) in the Philippines gave prophylactic plasmochin compound to eight individuals and prophylactic quinine to eight others. Two of the first group and six of the second acquired malaria during an eight weeks' test during which they were not under strict control. He concluded that plasmochin compound is apparently efficacious when used as a prophylactic against malaria and maintains more subjects negative to malaria than quinine alone. He gave daily doses of 0.01 gram of plasmochin combined in tablet form with 0.125 gram quinine sulphate to the first group and 10 grains of quinine sulphate daily to the second.

A number of references may be found to a tendency that plasmochin seems to have to attack gametocytes in such a way that they become devitalized and noninfective to mosquitoes. Consult, for example, Roehl;(149,151) Green;(56) Manson-Bahr;(97,98) Barber, Komp, and Newman;(11) and Whitmore, Roberts, and Jantzen.(193) There seems to be no doubt that plasmochin has a genuine usefulness in malaria therapy, although the tendency is to recommend that it be combined with quinine for greater safety and effectiveness; consult, for example, Green,(56) Manson-Bahr,(97,98) and Sinton.(165)

The paucity and yet suggestiveness of the evidence as regards prophylactic properties of plasmochin led to the experiments reported in this paper.

GENERAL PROCEDURE

In the experiments here reported female canaries (*Serinus canarius*) were used. These birds were purchased from local dealers and were susceptible to the plasmodium involved. Female birds were used because they cost less than males. The parasite, *Plasmodium cathemerium* (Hartman, 1927), in over two hundred cases has invariably established itself in these

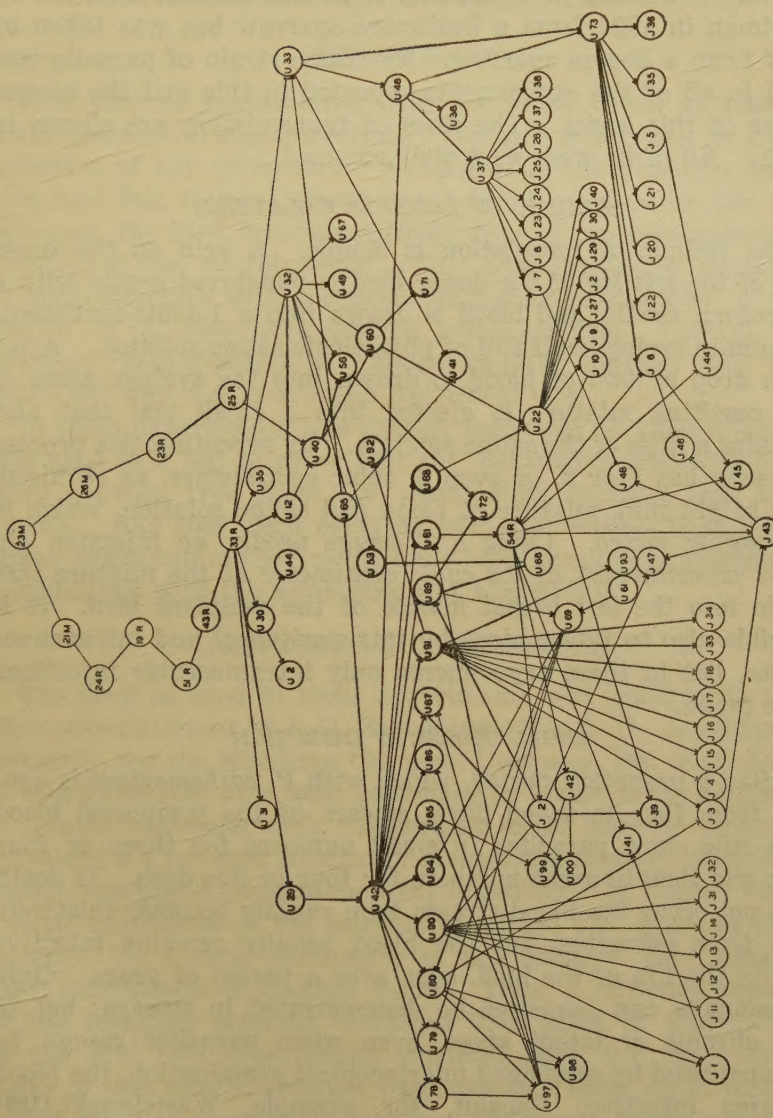

FIG. 1. Lines of transmission and attempted transmission of *Plasmodium cathemerium*. Experiments 1 to 4.

birds upon injection, except during the periods of plasmochin administration as noted below. This parasite was obtained through the courtesy of Dr. C. G. Huff and is his "Boston strain." It is not in direct line from the original isolation by Hartman in 1924 from a Baltimore sparrow but was taken by Huff from a Boston sparrow. The same strain of parasite was used in all of the experiments reported in this and the second paper of this series. The lines of transmission are shown in fig. 1. All birds were kept well screened.

TECHNIC OF BLOOD INOCULATIONS

The technic of inoculation is simple. A vein on the inner side of the left leg of the donor bird is punctured gently with a Hagedorn needle, and blood is drawn into a 1-cubic-centimeter tuberculin syringe half full of physiologic saline solution. After each drop or two of blood is drawn into the syringe some of the resulting mixture is ejected into a small vial that also contains a little of the saline solution. By repeating this process one soon has 1 or 2, or even 3, cubic centimeters, as required, of a bright pink mixture of blood and saline solution, which is thoroughly mixed. Using a 27-gauge needle, an injection (in these experiments) of 0.3 cubic centimeter of the mixture was made into the left breast muscle of the recipient bird. It is possible also to infect birds by intraperitoneal and intravenous routes, but in these experiments only intramuscular injections were made.

USUAL COURSE OF INFECTION

After a prepatent period, which with *P. cathemerium* is usually from four to seven days, smears of the peripheral blood as a rule show parasites in small numbers for three or four days and then in great numbers for four or five days. If death does not occur the blood stream then rapidly becomes relatively free from parasites, but the blood usually remains infective during the life of the bird, even over a period of years. Only occasionally can parasites be demonstrated in smears; but in this chronic or latent stage, even when parasites cannot be demonstrated by prolonged microscopical examination, the blood remains infective. Consult, for example, Wasielewski,(189) Sergent and Sergent, (160) and Whitmore;(192) or take the case of bird X36 in one of my experiments, typical of others in the series. This bird became positive nine days after receiving an injection of 0.3 cubic centimeter of blood-saline mixture

taken as described above, from bird J53. A 30-minute examination of a blood smear from this donor bird (J53) taken the day before, again at the time it was being bled for the inoculation of X36, and the next day, showed no parasites at all.

SUPERINFECTION

If a bird be reinoculated with the same strain of plasmodium there is no superinfection. The bird is immune to a new infection of any given strain so long as it has a chronic infection, and this, in most cases, means for the rest of its life. If, however, the bird becomes entirely free of the plasmodium in question it can be reinfected. This phenomenon of immunity to superinfection with the same species of plasmodium is well known to all who have studied avian malaria. Consult, for example, Wasielewski,(189) Moldovan,(115) Sergent and Sergent,(160) and Taliaferro and Taliaferro.(175)

In these experiments this fact of immunity to superinfection was used as a test to prove that the plasmochin-protected birds were actually free from the plasmodium injected into their muscle. Had they been carrying parasites hidden from blood-smear examination they would have been immune to subsequent inoculations with the same strain of plasmodium.

ADMINISTRATION OF PLASMOCHIN

The drug as used in these experiments was plasmochin simplex, manufactured by I. G. Farbenindustrie A. G., Leverkusen, Germany, for the Winthrop Chemical Company, Inc., New York. It was purchased at a local pharmacy in boxes of ten ampoules of 1 cubic centimeter each. According to the label the ampoules contained a 1 per cent solution of plasmochin simplex, *N*-diethyl-amino-isopentyl-8-amino-6-methoxy-quinoline. In other words 1 cubic centimeter of the solution contained 0.01 gram of plasmochin. To 1 cubic centimeter of this solution were added 4 cubic centimeters of distilled water. Thus, 5 cubic centimeters of the resulting solution contained 0.01 gram of plasmochin. In the first two experiments reported here, 0.1 cubic centimeter of this diluted solution was used as a daily dose; that is, 0.0002 gram of plasmochin simplex. This was given intramuscularly in the right breast, on the opposite side to that used for the parasite inoculation.

In the third experiment here recorded and in a fourth described in the second paper of this series the dose of plasmochin simplex was 0.00016 gram.

In some cases in the first two experiments there was necrosis at the site of injection; but by making the injections well anterior to avoid hæmatomata and by inserting the needle deep in the muscle and holding it steady during the injection, necrosis was prevented in the last two experiments and the birds tolerated the injections very well.

In the first two experiments the mortality for a period of ten days after the first injection of plasmochin among the twenty-one birds used was 71 per cent. In the eleven control birds (receiving no plasmochin) during the same period it was 45 per cent. In the last two experiments with improved technic, a smaller dose of plasmochin, and probably a stronger lot of birds, the mortality for ten days in the twenty birds receiving plasmochin was 15 per cent and in the control group of fourteen birds it was 29 per cent (see Tables 1 and 2).

TABLE 1.—*Mortality in first, second, and third experiments.*

	Number of birds.	Died in 10 days or less.		Died in 15 days or less.		Died in 30 days or less.		Alive after 176 days or more.	
		Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
First experiment:									
Plasmochin series	6	3	50	4	67	5	83	1	7
Controls	7	3	43	4	57	7	100	0	0
Total	13	6	46	8	62	12	92	1	8
Second experiment:									
Plasmochin series	15	12	80	13	87	14	93	(b)	------
Controls	4	2	50	3	75	3	75	(c)	------
Total	19	14	74	16	84	17	89	------	------
Third experiment:									
Plasmochin series [a]	10	2	20	2	20	4	40	1	10
Controls	4	0	0	0	0	2	50	2	50
Total	14	2	14	2	14	6	43	3	21
Totals for three experiments:									
Plasmochin series	31	17	55	19	61	23	74	2	6
Controls	15	5	33	7	47	12	80	2	3
Total	46	22	48	26	57	35	76	4	9

[a] Six lived more than forty-five days.
[b] One lived thirty-four days.
[c] One lived seventy-seven days.

TABLE 2.—*Mortality, first and second versus third and fourth experiments.*

	Number of birds.	Died in 10 days or less.		Died in 15 days or less.		Died in 30 days or less.		Alive after 170 days or more.	
		Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
Plasmochin series:									
First and second experiments	21	15	71	17	81	19	20	1	5
Third and fourth experiments	20	3	15	3	15	7	35	5	25
Total	41	18	44	20	49	26	63	6	15
Controls:									
First and second experiments	11	5	45	7	63	10	90	0	0
Third and fourth experiments	14	4	29	5	36	10	71	4	29
Total	25	9	36	12	48	20	80	4	16
Totals:									
First and second experiments	32	20	63	24	75	29	91	1	3
Third and fourth experiments	34	7	21	8	42	17	50	9	26
Total	66	27	41	32	48	46	70	10	15

The size of the dose was determined by the fact that 0.0002 gram was the largest amount of plasmochin simplex which would not cause signs of drug absorption in canaries. Increasing the dosage caused signs beginning with unsteadiness of gait and progressing as the dose became larger to coma and death. (See the second paper of this series for a discussion of the minimum lethal dose.)

BLOOD EXAMINATION

Blood smears were stained with Giemsa's stain and were examined until a parasite was seen or, if none was seen, up to a total of thirty minutes. If no parasites were found in thirty minutes, the slide was called negative. If positive, it was classified in accordance with the following scheme:

\+ Positive in thirty minutes or less.
\++ Two parasites per field found more than twice in one minute.
\+++ Three parasites per field found more than three times in one minute.
\++++ Four parasites per field found more than four times in one minute.
\+++++ Ten or more parasites per field on the average.

This practical method of classification is suitable for this experiment. The fact that it is a fairly good grouping may be seen from Table 3, which also serves to present evidence as to the approximate meaning of the plus signs.

TABLE 3.—*Intensity grouping of blood smears.*

Group.	Number of smears counted.	Parasites counted per 10,000 red blood cells.
+	74	15
++	19	170
+++	18	320
++++	15	560
+++++	44	1,320

FIRST EXPERIMENT (JUNE 19 TO JULY 21, 1930)

In the first experiment, as shown in fig. 2, plasmochin injections were started in six birds, U3, U12, U27, U28, U29, and U33. Of these, only three, U12, U33, and U29, lived beyond the first ten days of the experiment. There were seven controls, U2, U25, U30, U31, U32, U34, and U35, of which two, U25 and U34, died within ten days. The others all developed typical infections. Of the three birds receiving plasmochin two, U12 and U29, died before they could be proved susceptible to malaria. In the case of U12 blood was taken ten days after the attempt to infect it. This blood proved to be noninfective to bird U40, which twenty-seven days later was proved to be susceptible to the same species of plasmodium. In the case of U29 blood was taken eight days after the attempt to infect it. This blood proved to be noninfective to U42, which twenty-seven days later was proved to be a susceptible bird.

There follow the protocols of U12, U33, and U29, which are illustrated in figs. 3, 4, and 5.

FIRST EXPERIMENT

Protocol 1. Bird U12.

June 19, 1930. Blood smear negative from *U12* (30 minutes).

June 28. Blood smear negative from *U12* (30 minutes).

June 30 to July 6. *U12* received 0.0002 gram plasmochin simplex by intramuscular injection each day into right breast.

July 2. *U12* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird 33R, known to be infective.

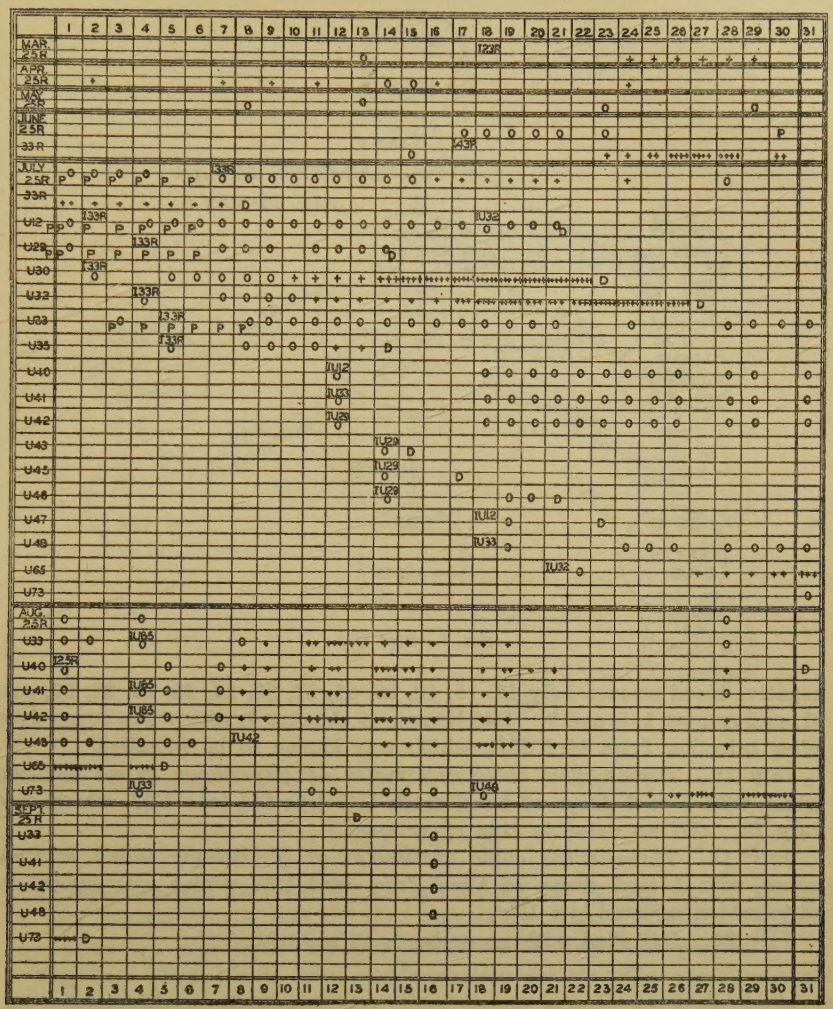

FIG. 2. Plasmochin simplex, a prophylactic drug in avian malaria. First experiment.

An equal amount of the same mixture was given at the same time to bird U30, as a control. Both injections made into left breast muscle. Control bird, U30, became + July 10 and died July 23 of severe malaria.

July 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, and 21. Daily blood smears from *U12* negative. (Each smear searched for 30 minutes.)

July 12. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U12* injected into U40 which had

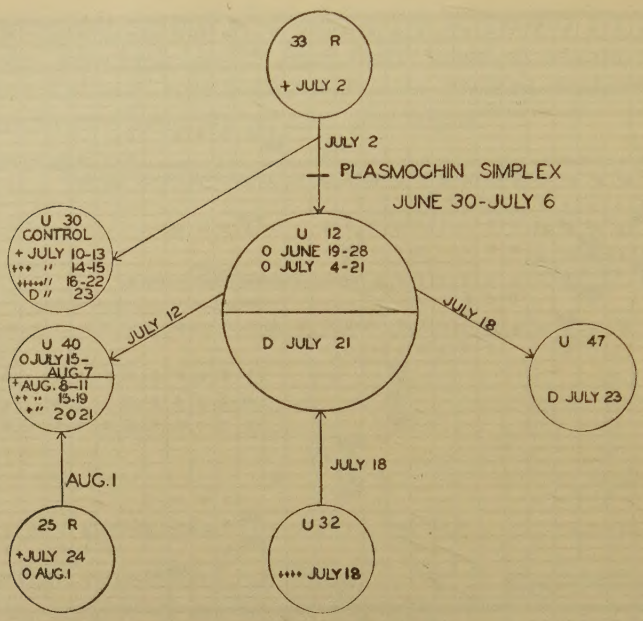

FIG. 3. Bird U12.

negative blood smears July 12, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 29, and 31, and August 1, 5, and 7. U40 became + August 8, which was seven days after injection from bird 25R, which was known to be infective.

July 18. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U12* injected into U47, which died July 23. (Of no value in this experiment.)

July 18. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from bird U32, which was known to be infective, injected into *U12*.

July 21. *U12* died with no evidence of malaria.

Protocol 2. Bird U29.

June 30, 1930. Blood smear from *U29* negative (30 minutes).

July 1. Blood smear from *U29* negative (30 minutes).

June 30 to July 6. *U29* received 0.0002 gram plasmochin simplex by intramuscular injection each day into right breast.

July 4. *U29* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird 33R, known to be infective. An equal amount of the same mixture was given at the same time to bird U32, as a control. Both injections were made into left-breast muscle. The control bird, U32, became + July 11 and died July 26 after severe malaria.

July 7, 8, 9, 11, 12, 13, and 14. Daily blood smears from *U29* negative. (Each smear searched for 30 minutes.)

July 12. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from *U29* injected into U42, which had neg-

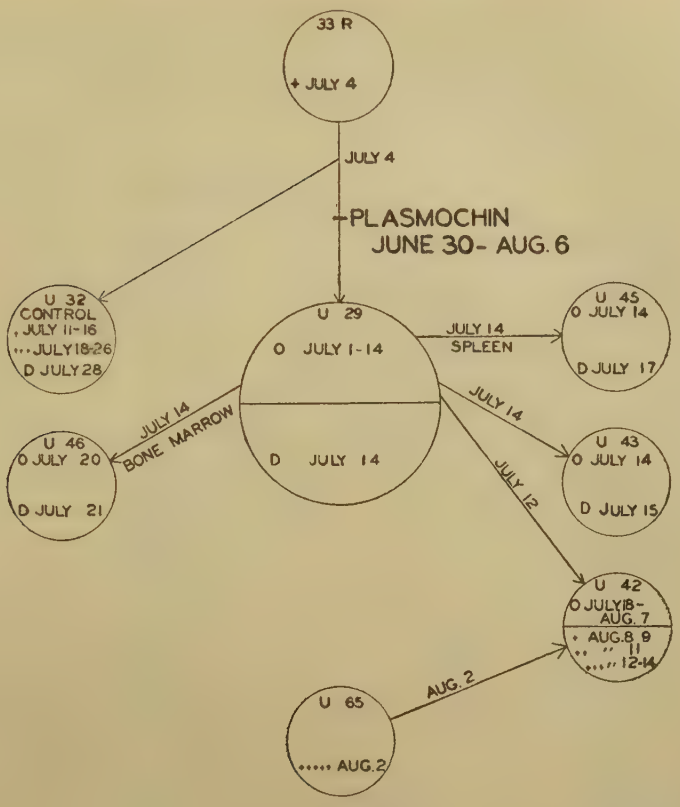

FIG. 4. Bird U29.

ative blood smears July 12, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 29, and 31, and August 1, 4, 5, and 7. U42 became + August 8, which was four days after injection from bird U65, which was known to be positive.

July 14. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from *U29* injected into U43, which died July 15. (Of no value in this experiment.)

July 14. *U29* died.

Physiologic saline mixture of bone marrow from *U29* injected into U46, whose blood smear was negative July 20 and which died July 21.

Physiologic saline mixture of spleen pulp from *U29* injected into U45, which died July 17. (Of no value in this experiment.)

Protocol 3. Bird U33.

July 3, 1930. Blood smear from *U33* negative (30 minutes).

July 3 to 8. *U33* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

July 5. *U33* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird 33R, known to be infective. An equal amount of the same mixture was given at the same time to bird

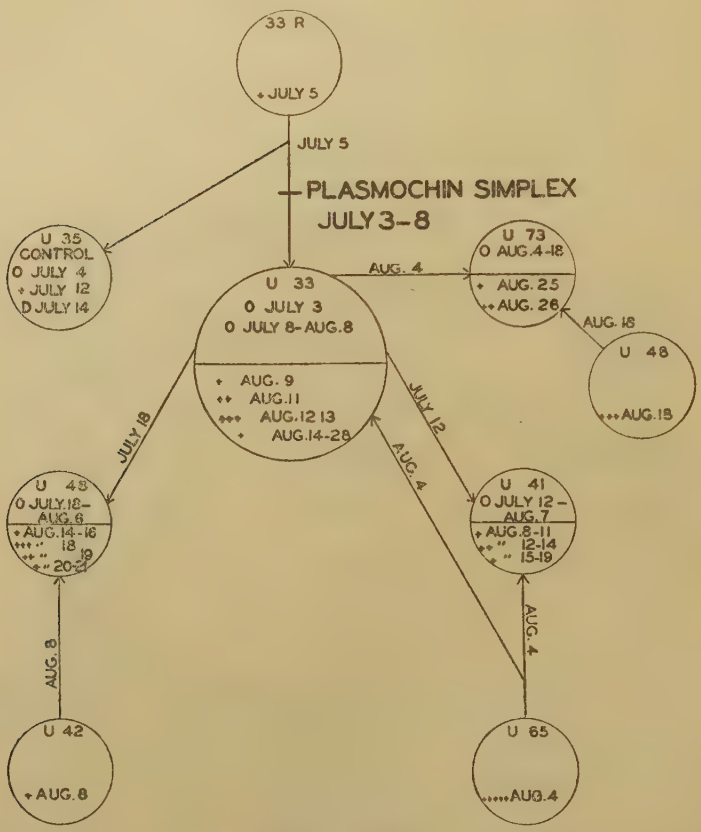

FIG. 5. Bird U33.

U35, as control. All injections were made into left breast muscle. U35 became positive July 12 and died July 14 of severe malaria.

July 8, 9, 10, 11, 12, 13, 14, 15, 16, 24, 28, 29, 30, and 31, and August 1, 2, 4, and 8. Daily blood smears from *U33* negative. (Each smear searched for 30 minutes.)

July 12. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U33* injected into U41, which had negative blood smears July 12 to August 7. U41 became positive August 8, which was four days after injection from U65, which was known to be positive.

July 18. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U33* injected into U48, which had negative blood smears July 19 to August 6. U48 became positive August 14, which was six days after injection from U42, which was known to be positive.

August 4. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U33* injected into U73, which had negative blood smears July 31 to August 18. U73 became positive

August 25, which was seven days after injection from U48, which was known to be positive.

August 4. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird U65, known to be infective, injected into *U33*.

August 9, *U33* +; August 11, *U33* ++; August 12 and 13, *U33* +++; August 14 to 28, *U33* +; October 11, *U33* +.

SECOND EXPERIMENT (JULY 19 TO AUGUST 24, 1930)

Encouraged by the one clear-cut success in the first experiment, a series of fifteen birds, U50 to U64, were given plasmochin simplex in 0.0002 gram intramuscular doses, as described above, every day for seven days. Infected blood was injected into these birds and into four control birds, U7, U65, U66, and U67, on the third day. Two of the controls, U7 and U66, and ten of the birds receiving plasmochin, U50 to U52, U57 to U59, and U62 to U64, died within ten days and were of no value in the experiment. The other two controls had typical malaria infections (see fig. 6).

Of the five remaining birds receiving plasmochin two, U56 and U60, lived thirty-five and thirty-one days, respectively; long enough to give clear-cut results. The other three died before they could be proved to be susceptible. None showed any evidence whatever of malaria after thirteen, thirteen, and fourteen days, respectively. In the case of U53 and U61 blood was taken on the ninth day after attempted infection. This blood proved to be noninfective when injected into birds that in each case were proved to be susceptible twenty-eight days later.

The protocols of U53, U54, U56, U60, and U61 follow. These protocols are illustrated in figs. 6 to 10, inclusive.

SECOND EXPERIMENT

Protocol 1. Bird U53.

July 19, 1930. Blood smear from *U53* negative (30 minutes).

July 19 to 24. *U53* received 0.0002 gram plasmochin simplex by intramuscular injection each day about 10 a. m. into right breast.

July 21. *U53* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from U32, known to be infective. An equal amount of the same mixture was given at the same time to birds U64, U65, U66, and U67, as controls. All injections were made into left breast muscle about 3 p. m. Control bird U64 died, negative, July 26; U65 became + July 27 and died August 5 of severe malaria; U66 died, negative, July 27; U67 became + July 27 and had a mild infection.

July 28, 29, 30, and 31. Daily blood smears from *U53* negative. (Each smear searched for 30 minutes.)

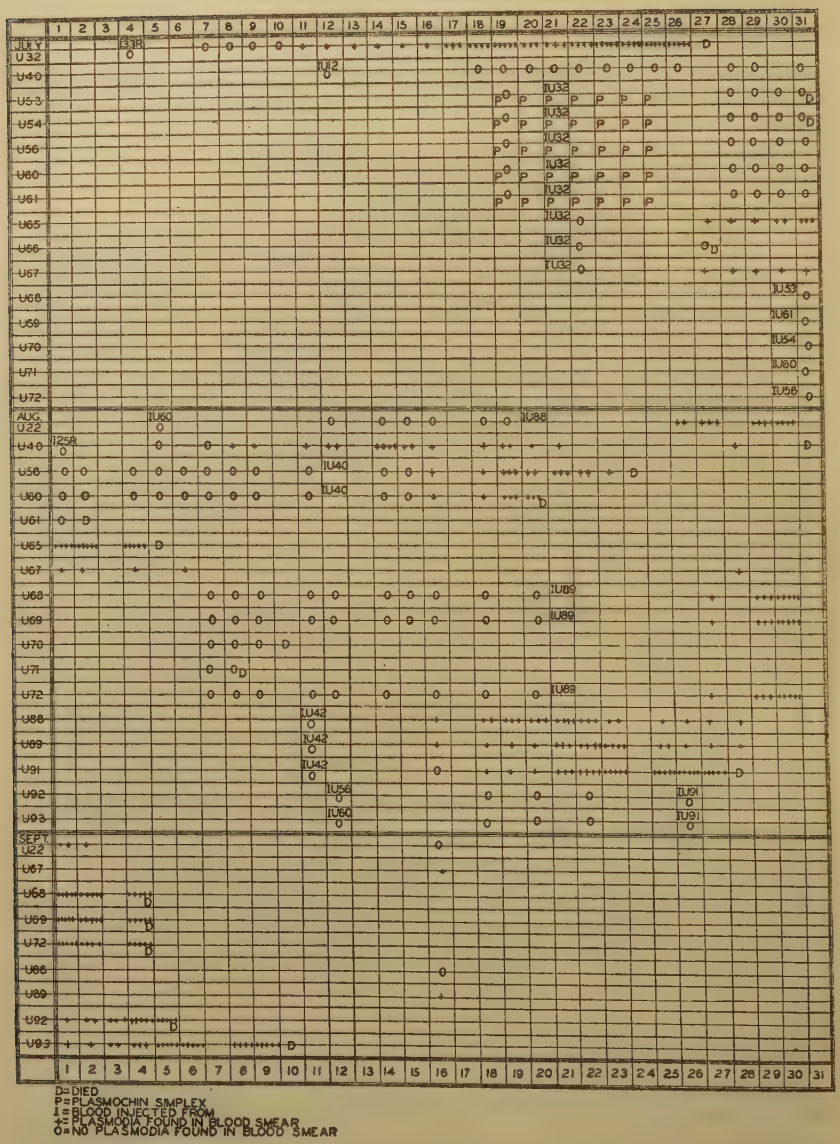

FIG. 6. Plasmochin simplex, a prophylactic drug in avian malaria. Second experiment.

July 30. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U53* injected into U68, which had negative blood smears July 31, and August 7, 8, 9, 11, 12, 14, 15, 16, 18, and 20. U68 became + August 27, which was six days after injection from bird U89, which was known to be infective.

July 31. *U53* died with no evidence of malaria.

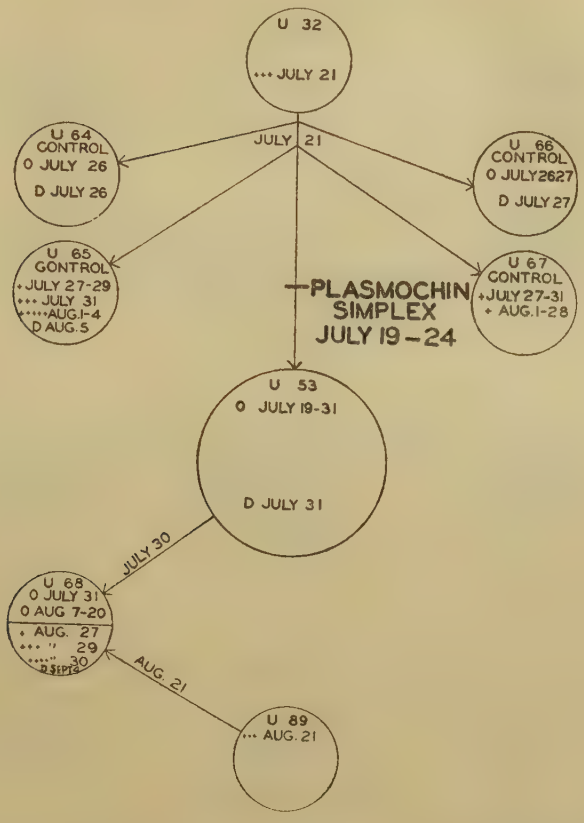

FIG. 7. Bird U53.

Protocol 2. Bird U54.

July 19, 1930. Blood smear from *U54* negative (30 minutes).

July 19 to 24. *U54* received 0.0002 gram plasmochin simplex by intramuscular injection each day about 10 a. m. into right breast.

July 21. *U54* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U32, known to be infective. An equal amount of the same mixture was given at the same time to birds U64, U65, U66, and U67, as controls. All injections were made into left breast muscle about 3 p. m. Control bird U64 died, negative, July 26; U65 became + July 27 and died August 5 of severe malaria; U66 died, negative, July 27; U67 became + July 27 and had a mild infection.

July 28, 29, 30, and 31. Daily blood smears from *U54* negative. (Each smear searched for 30 minutes.)

July 30. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U54* injected into U70, which was negative August 7, 8, and 9 and died August 10 with no evidence of malaria.

July 31. *U54* died with no evidence of malaria.

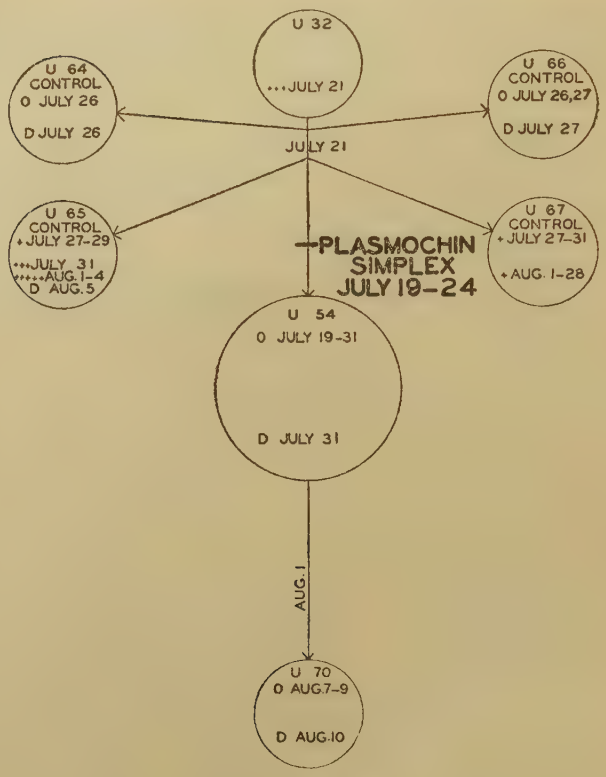

FIG. 8. Bird U54.

Protocol 3. Bird U56.

July 19, 1930. Blood smear from *U56* negative (30 minutes).

July 19 to 24. *U56* received 0.0002 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

July 21. *U56* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U32, known to be infective. An equal amount of the same mixture was given at the same time to birds U64, U65, U66, and U67, as controls. All injections were made into left breast muscle. U65 and U67 became positive July 27. U64 and U66 died July 26 and 27, respectively.

July 28, 29, 30, and 31, and August 1, 2, 4, 5, 6, 7, 8, 9, 11, 14, and 15. Daily blood smears from *U56* negative. (Each smear searched for 30 minutes.)

July 30. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U56* injected into U72, which had negative blood smears July 31 to August 20. U72 became positive August 27, which was six days after injection from U89, which was known to be positive.

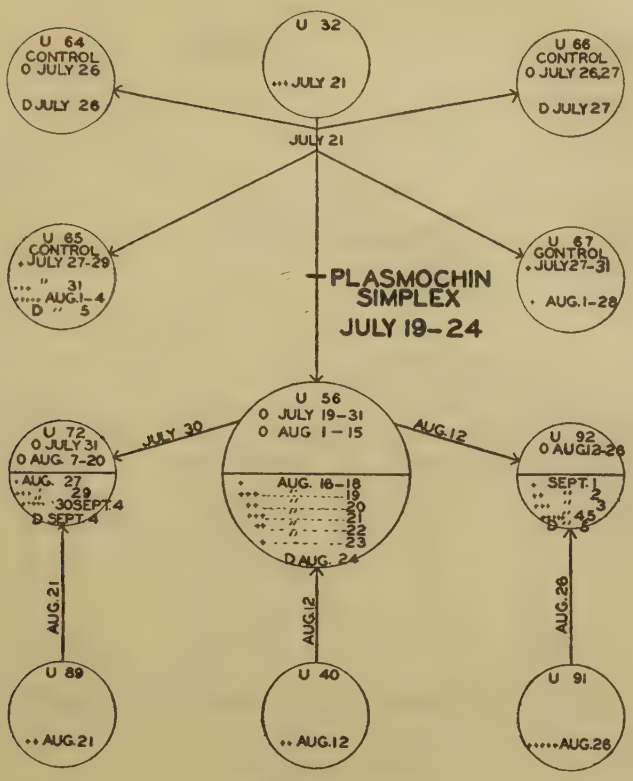

FIG. 9. Bird U56.

August 12. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U56* injected into U92, which had negative blood smears August 12 to 26. U92 became positive September 1, which was six days after injection from U91, which was known to be positive.

August 12. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird U40, known to be infective, injected into *U56*.

August 16 and 18, *U56* +; August 19, *U56* +++; August 20, *U56* ++; August 21, *U56* +++; August 22, *U56* ++; August 23, *U56* +; August 24, died.

Protocol 4. Bird U60.

July 19, 1930. Blood smear from *U60* negative (30 minutes).

July 19 to 24. *U60* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

July 21. *U60* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U32, known to be infective. An equal amount of the same mixture was given at the same time to birds

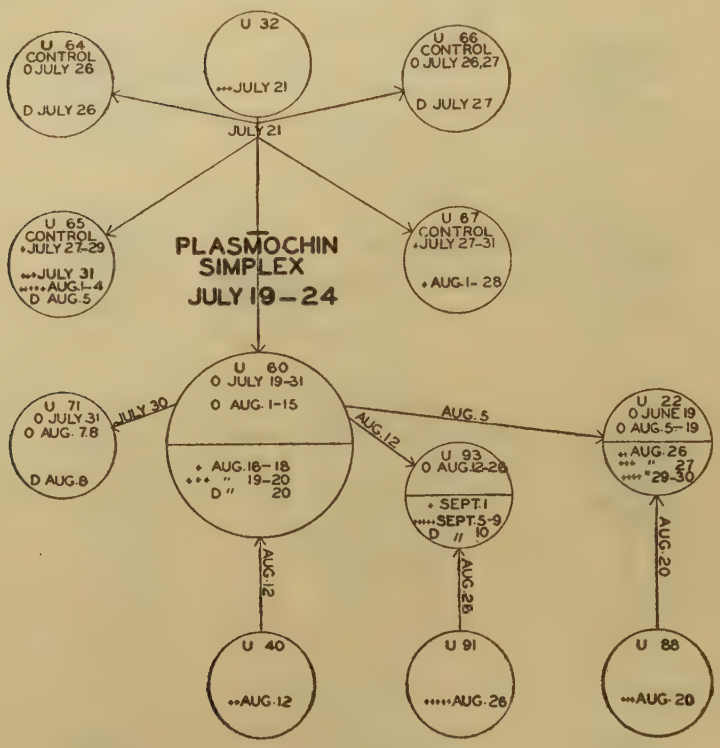

FIG. 10. Bird U60.

U64, U65, U66, and U67, as controls. All injections were made into left breast muscle. U65 and U67 became positive July 27. U64 and U66 died July 26 and 27, respectively.

July 28, 29, 30, and 31, and August 1, 2, 4, 5, 6, 7, 8, 9, 11, 14, and 15. Daily smears from *U60* negative. (Each smear searched for 30 minutes.)

July 30. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U60* injected into U71, which had negative blood smears August 7 and 8 and died August 8.

August 5. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U60* injected into U22, which had negative blood smears June 19 to August 19. U22 became positive August 26, which was six days after injection from U88, which was known to be positive.

August 12. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U60* injected into U93, which had negative blood smears August 12 to 26. U93 became positive September 1, which was six days after injection from U91, which was known to be positive.

August 12. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird U40, known to be infective, injected into *U60*.

August 16 and 18, *U60* +; August 19 and 20, *U60* +++; August 20, *U60* died.

Protocol 5. Bird U61.

July 19, 1930. Blood smear from *U61* negative (30 minutes).

July 19 to 24. *U61* received 0.0002 gram plasmochin simplex by intramuscular injection each day about 10 a. m. into right breast.

July 21. *U61* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U32, known to be infective. An equal amount of the same mixture was given at the same time to birds U64, U65, U66, and U67, as controls. All injections were made into left breast muscle about 3 p. m. Control bird U64 died, negative, July 26; U65 became + July 27 and died August 5 of severe malaria; U66 died, negative, July 27; U67 became + July 27 and had a mild infection.

July 28, 29, 30, and 31, and August 1. Daily blood smears from *U61* negative. (Each smear searched for 30 minutes).

July 30. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U61* injected into U69, which had negative blood smears July 31, and August 7, 8, 9, 11, 12, 14, 15, 16, 18, and 20. U69 became + August 27, which was six days after injection from U89, which was known to be infective.

August 2. *U61* died with no evidence of malaria.

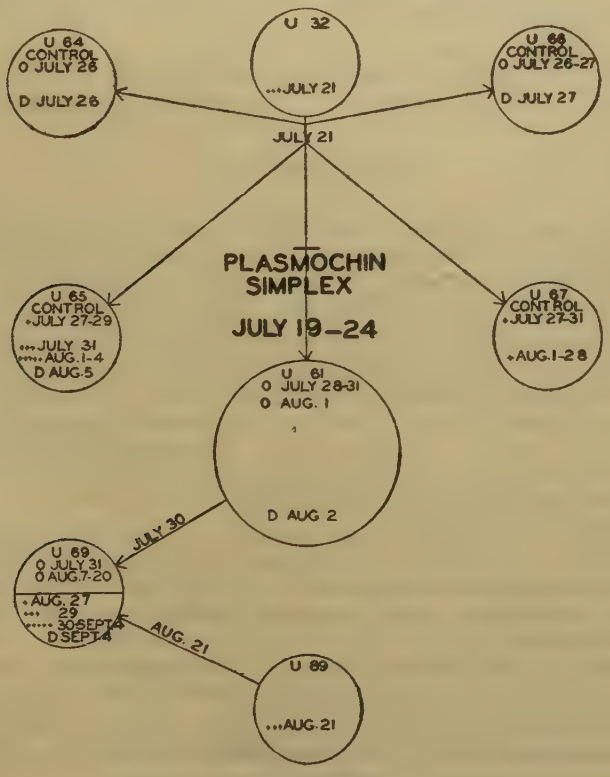

FIG. 11. Bird U61.

THIRD EXPERIMENT (AUGUST 9 TO OCTOBER 9, 1930)

Using a smaller dose, 0.00016 gram, as explained above, ten canaries, U78 to U87, were given daily intramuscular injections of plasmochin and were injected with infected blood on the third day (see fig. 11). Four controls, U88 to U91, were also injected with the same amount of the same blood taken at the same time. All of the controls developed typical malaria. Two of the birds receiving plasmochin, U82 and U83, died within ten days and were of no use in the experiment. The other eight all lived long enough to demonstrate clearly that their plasmochin injections had prevented malaria. Each of the four birds U78, U79, U80, and U84, after being negative for twenty-one days, was proved to be susceptible to the plasmodium used in the first injection. Four birds, U81, U85, U86, and U87, remained negative for forty-four days each and were then proved to be susceptible. Blood taken from U78, U79, U81, U85, and U87 on the twenty-first, sixteenth, fourteenth, and forty-fourth days, respectively, proved to be noninfective to birds that in each case after two weeks were proved to be susceptible birds.

There follow the protocols of birds U78, U79, U80, U81, U84, U85, U86, and U87. These are illustrated by figs. 12 to 19, inclusive.

THIRD EXPERIMENT

Protocol 1. Bird U78.

August 9, 1930. Blood smear from *U78* negative (30 minutes).

August 9 to 15. *U78* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 11. *U78* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U42, known to be infective. An equal amount of the same mixture was given at the same time to birds U88, U89, U90, and U91, as controls. All injections were made into left breast muscle. U88 and U89 became positive August 16; U90 and U91, August 18. U91 died August 28 of severe malaria.

August 18, 19, 21, 23, 25, 27, and 29. Daily smears from *U78* negative. (Each smear searched for 30 minutes.)

September 1. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U78* injected into U97, which had negative blood smears September 1, 6, 9, 11, and 13. U97 became + September 22, which was seven days after injection from U80, which was known to be positive.

September 1. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird U69, known to be infective, injected into *U78*.

September 6 and 8, *U78* +; September 9, 10, 11, 12, and 13, *U78* +++++; September 14, *U78* died of acute malaria.

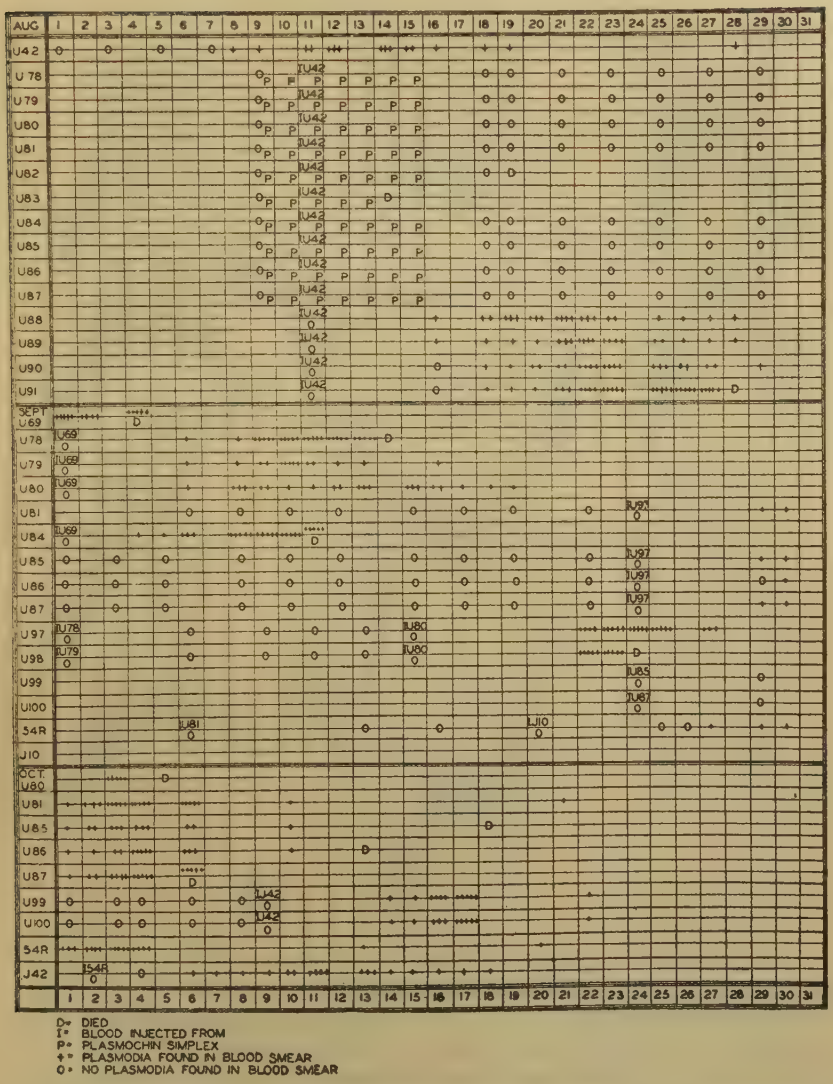

FIG. 12. Plasmochin simplex, a prophylactic drug in avian malaria. Third experiment.

Protocol 2. Bird U79.

August 9, 1930. Blood smear from *U79* negative (30 minutes).

August 9 to 15. *U79* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 11. *U79* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U42, known to be infective. An equal amount of the same mixture was given at the same time to birds U88, U89, U90, and U91, as controls. All injections were made into left

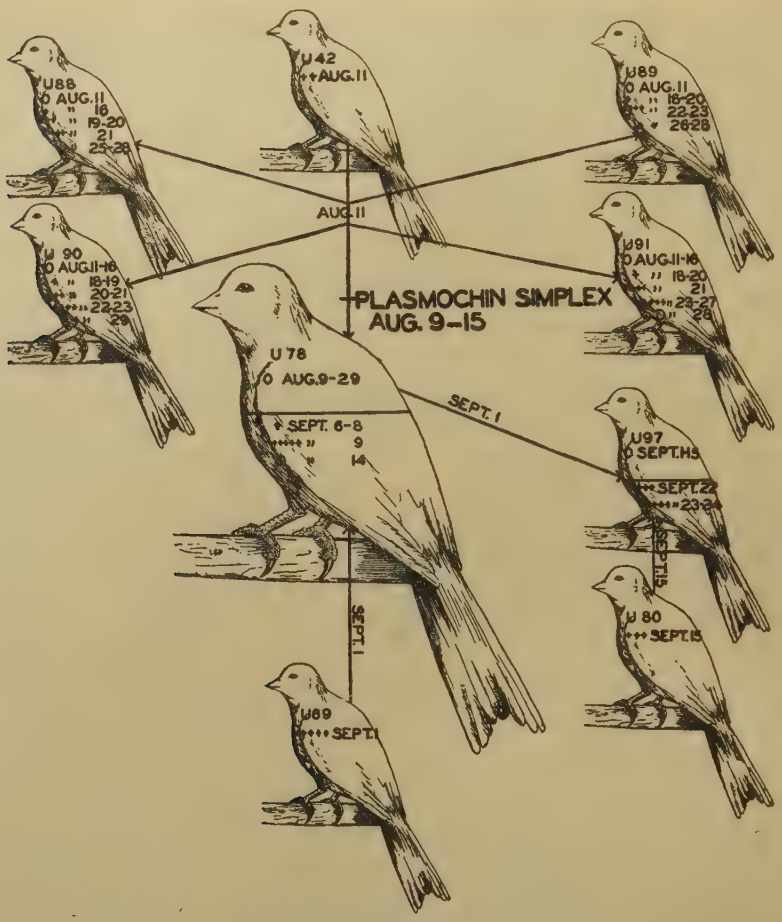

FIG. 13. U78.

breast muscle. U88 and U89 became positive August 16. U90 and U91 became positive August 18. U91 died August 28 of severe malaria.

August 19, 21, 23, 25, 27, and 29, and September 1. Daily blood smears from *U79* negative. (Each smear searched for 30 minutes.)

September 1. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U79* injected into U98, which had negative blood smears September 1 to 15. U98 became positive September 22, which was seven days after injection from U80, which was known to be positive.

September 1. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird U69, known to be infective, injected into *U79*.

September 6 to 8, *U79* +; September 9, *U79* ++; September 10, *U79* +++++; September 11, *U79* ++; September 12 to 16, *U79* +; October 3, *U79* died.

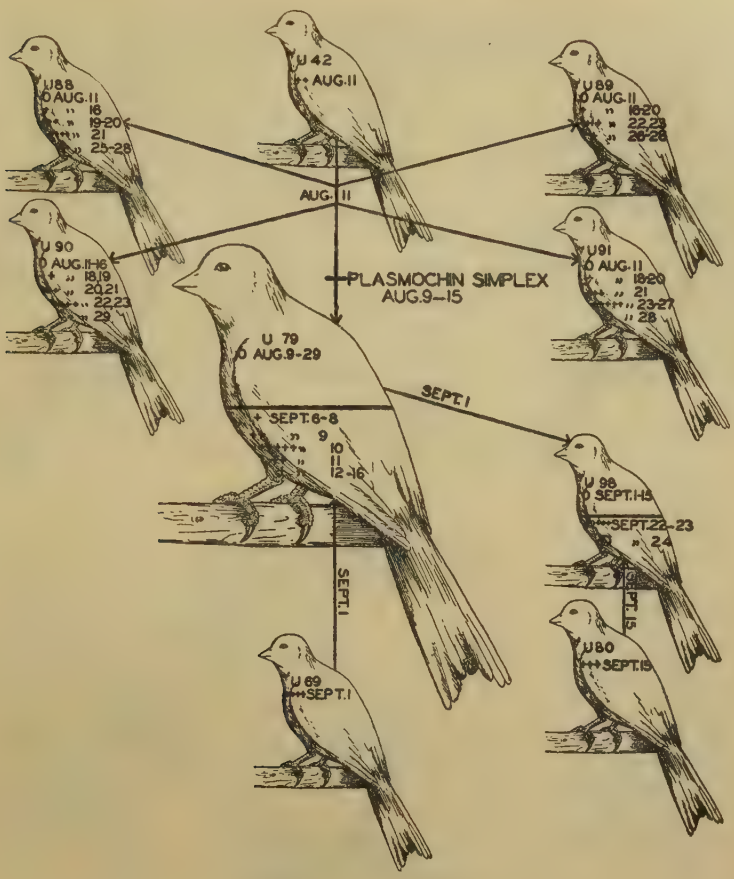

FIG. 14. Bird U79.

Protocol 3. Bird U80.

August 9, 1930. Blood smear from *U80* negative (30 minutes).

August 9 to 15. *U80* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 11. *U80* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U42, known to be infective. An equal amount of the same mixture was given at the same time to birds U88, U89, U90, and U91, as controls. All injections were made into left breast muscle. U88 and U89 became positive August 16. U90 and U91 became positive August 18. U91 died August 28 of severe malaria.

August 18, 19, 21, 23, 25, 27, and 29, and September 1. Daily blood smears from *U80* negative. (Each smear searched for 30 minutes.)

September 1. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird U69, known to be infective, injected into *U80*.

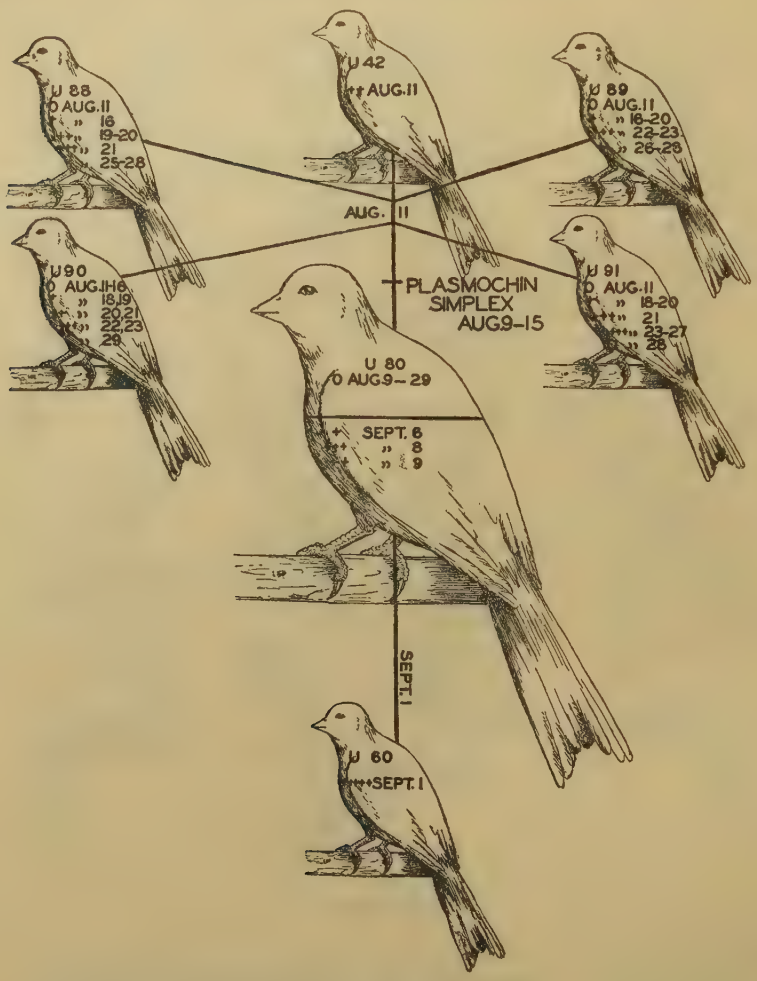

FIG. 15. Bird U80.

September 6, *U80* +; September 8, *U80* +++; September 9, *U80* ++; September 10 and 11, *U80* +; September 12, *U80* ++; September 13 and 15, *U80* +++; September 16, *U80* ++; September 17 to 19, *U80* +; October 3, *U80* +++++; October 5, *U80*, died.

Protocol 4. Bird U81.

August 9, 1930. Blood smear from *U81* negative (30 minutes).

August 9 to 15. *U81* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 11. *U81* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U42, known to be infective. An equal amount of the same mixture was given at the same

time to birds U88, U89, U90, and U91, as controls. All injections were made into left breast muscle. U88 and U89 became positive August 16. U90 and U91 became positive August 18. U91 died August 28 of severe malaria.

August 18, 19, 21, 23, 25, 27, and 29, and September 6, 8, 10, 12, 15, 17, 19, 22, and 24. Daily blood smears from *U81* negative. (Each smear searched for 30 minutes.)

September 6. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U81* injected into 54R, which had negative blood smears September 6 to 26. 54R became positive September 27, which was seven days after injection from J10, which was known to be positive.

September 24. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird U97, known to be infective, injected into *U81*.

September 29 and 30, *U81* +; October 1, *U81* +; October 2, *U81* +++; October 3 to 6, *U81* ++++++; October 10 and 21, *U81* +.

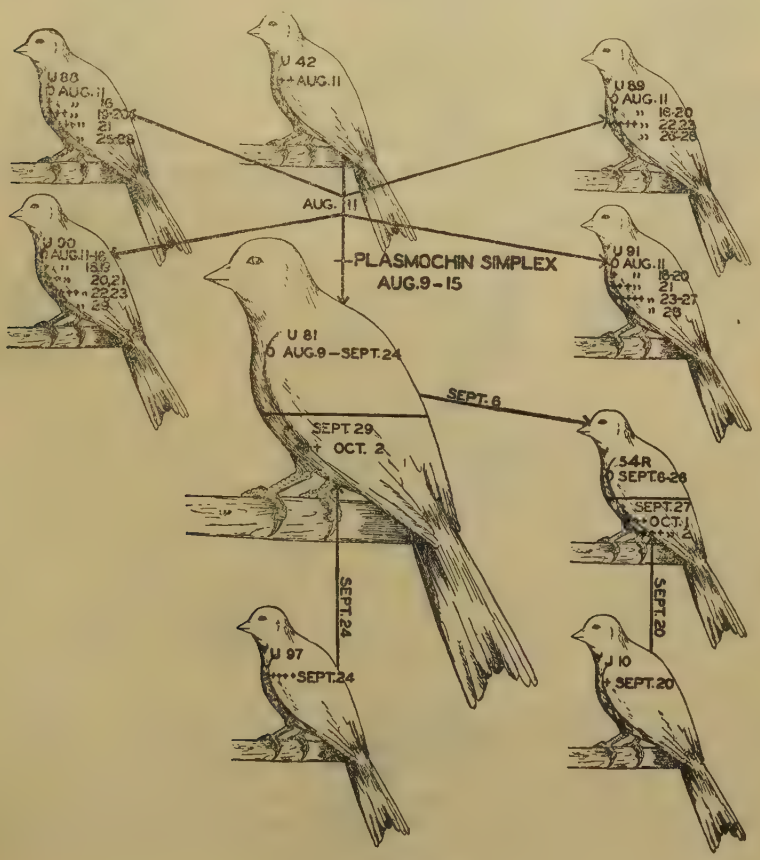

FIG. 16. Bird U81.

Protocol 5. Bird U84.

August 9, 1930. Blood smear from *U84* negative (30 minutes).

August 9 to 15. *U84* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 11. *U84* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U42, known to be infective. An equal amount of the same mixture was given at the same time to birds U88, U89, U90, and U91, as controls. All injections were made into left breast muscle. U88 and U89 became positive August 16. U90 and U91 became positive August 18. U91 died August 28 of severe malaria.

August 18, 19, 21, 23, 25, 27, and 29, and September 1. Daily blood smears from *U84* negative. (Each smear searched for 30 minutes.)

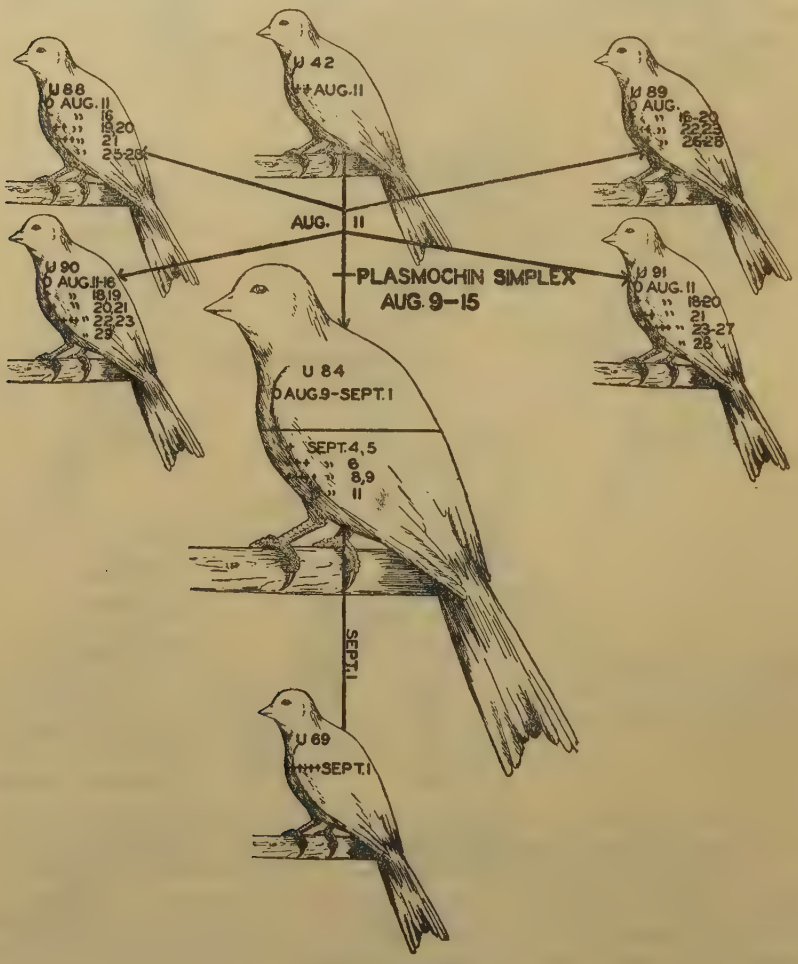

FIG. 17. Bird U84.

September 1. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird U69, known to be infective, injected into *U84*.

September 4 and 5, *U84* +; September 6, *U84* +++; September 8 to 11, *U84* +++++; September 11, *U84* died.

Protocol 6. Bird U85.

August 9, 1930. Blood smear from *U85* negative (30 minutes).

August 9 to 15. *U85* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 11. *U85* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U42, known to be infective. An equal amount of the same mixture was given at the same time to birds U88, U89, U90, and U91, as controls. All injections were made into left breast muscle. U88 and U89 became positive August 16. U90 and U91 became positive August 18. U91 died August 28 of severe malaria.

August 18, 19, 21, 23, 25, 27, and 29, and September 1, 3, 5, 8, 10, 12, 15, 17, 19, 22, and 24. Daily blood smears from *U85* negative. (Each smear searched for 30 minutes.)

September 24. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U85* injected into U99, which had negative blood smears September 24 to October 19. U99 became positive October 14, which was five days after injection from J42, which was known to be positive.

September 24. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird U97, known to be infective, injected into *U85*.

September 29 and 30 and October 1, *U85* +; October 2, *U85* ++; October 3 and 4, *U85* +++; October 6, *U85* ++; October 10, *U85* +; October 18, *U85* +++++; October 18, *U85* died.

Protocol 7. Bird U86.

August 9, 1930. Blood smear from *U86* negative (30 minutes).

August 9 to 15. *U86* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 11. *U86* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U42, known to be infective. An equal amount of the same mixture was given at the same time to birds U88, U89, U90, and U91, as controls. All injections were made into left breast muscle. U88 and U89 became positive August 16. U90 and U91 became positive August 18. U91 died August 28 of severe malaria.

August 18, 19, 21, 23, 25, 27, and 29, and September 1, 3, 5, 8, 10, 12, 15, 17, 19, 22, 24, and 29. Daily blood smears from *U86* negative. (Each smear searched for 30 minutes.)

September 24. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird U97, known to be infective, injected into *U86*.

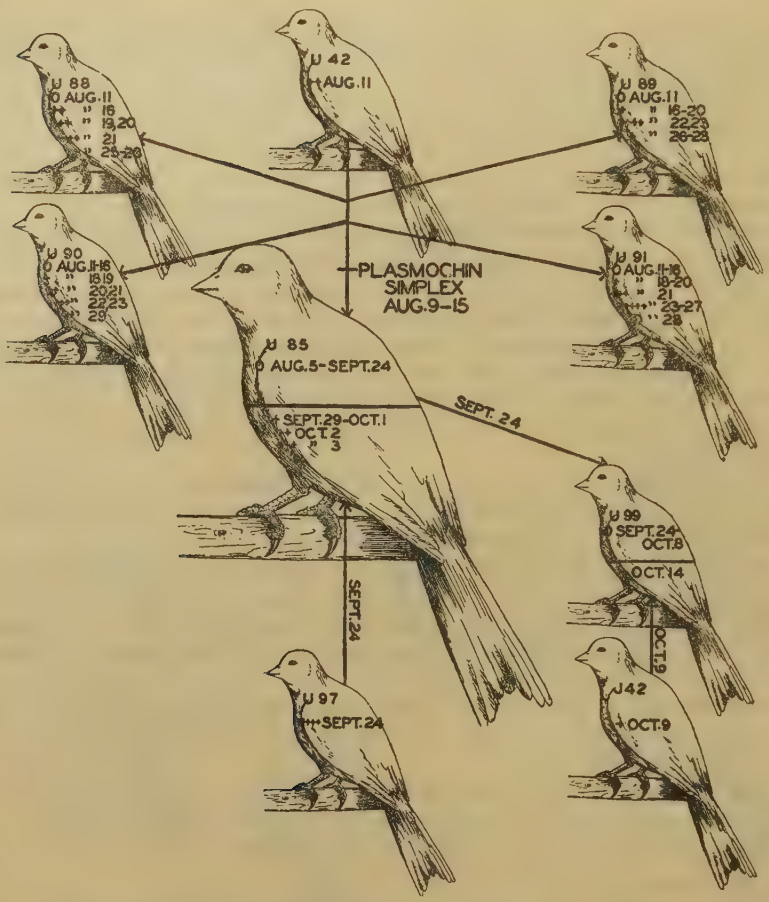

FIG. 18. Bird U85.

September 30 and October 1 and 2, *U86* +; October 3, *U86* ++; October 4, *U86* +++++; October 6, *U86* ++++; October 10, *U86* +; October 13, *U86* died.

Protocol 8. Bird U87.

August 9, 1930. Blood smear from *U87* negative (30 minutes).

August 9 to 15. *U87* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 11. *U87* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U42, known to be infective. An equal amount of the same mixture was given at the same time to birds U88, U89, U90, and U91, as controls. All injections were made into left breast muscle. U88 and U89 became positive August 16. U90 and U91 became positive August 18. U91 died August 28 of severe malaria.

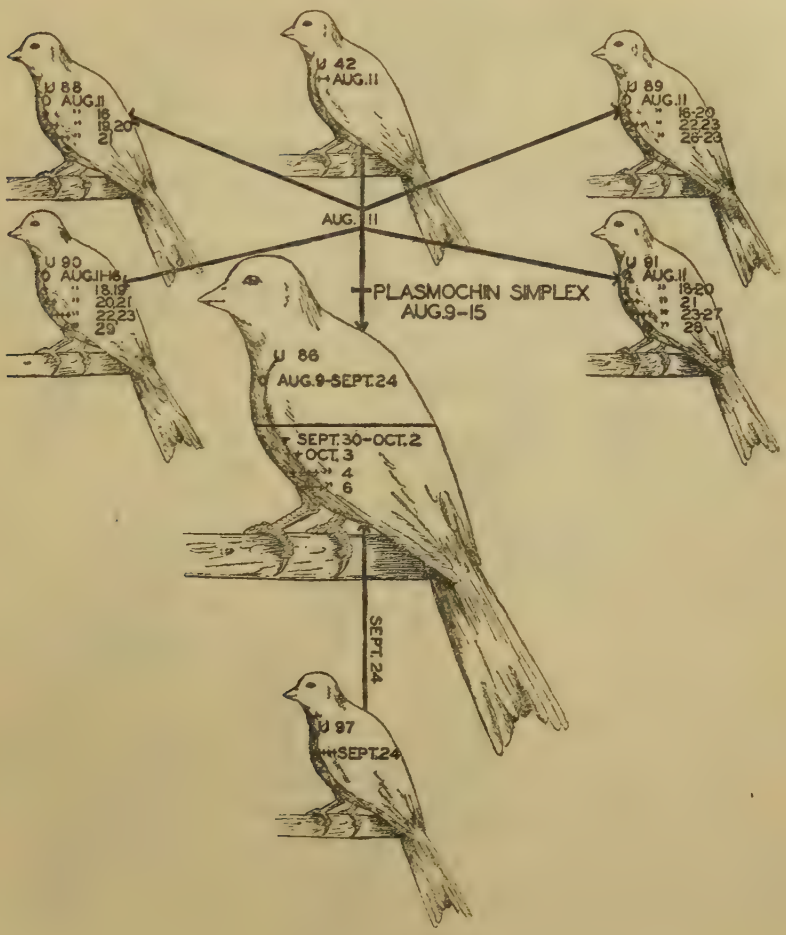

FIG. 19. Bird U86.

August 18, 19, 21, 23, 25, 27, and 29, and September 1, 3, 5, 8 10, 12, 15, 17, 19, 22, and 24. Daily blood smears from *U87* negative. (Each smear searched for 30 minutes.)

September 24. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *U87* injected into U100, which had negative blood smears September 24 to October 9. U100 became positive October 14, which was five days after injection from J42, which was known to be positive.

September 24. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird U97, known to be infective, injected into *U87*.

September 29 to October 1, *U87* +; October 2, *U87* ++; October 3, *U87* ++++; October 4 and 6, *U87* ++++++; October 6, *U87* died.

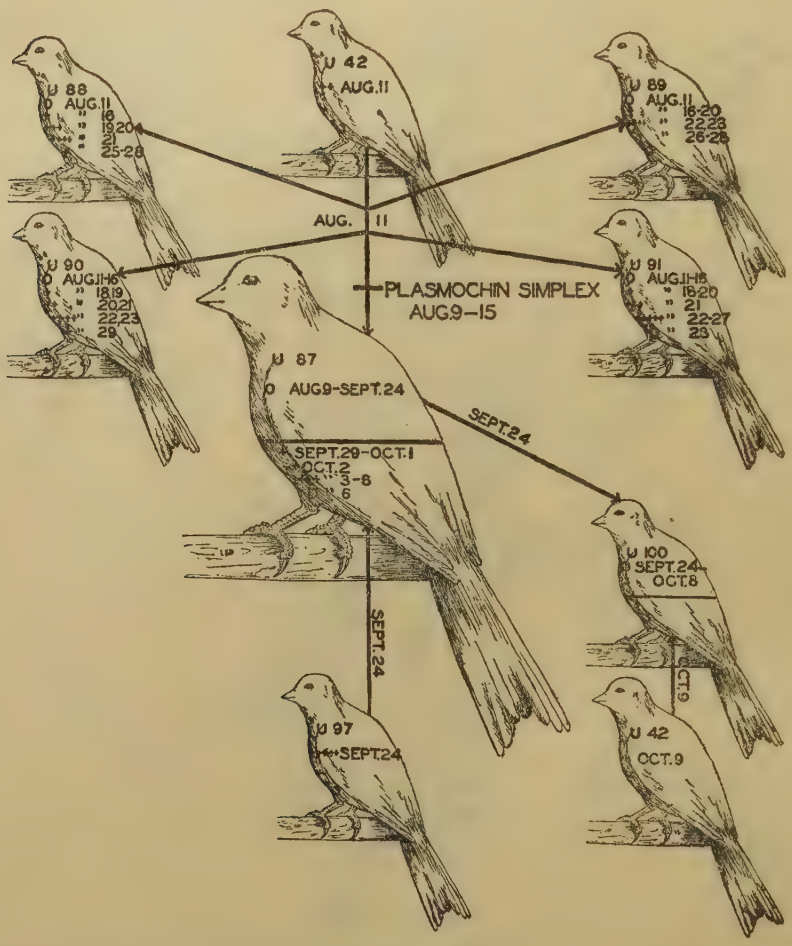

FIG. 20. Bird U87.

SUMMARY

Three experiments are reported in which canaries were given intramuscular injections of a mixture of saline and blood containing *Plasmodium cathemerium* on the third day of a week during which they received daily doses of plasmochin simplex intramuscularly. In no case was it possible to detect an infection in these birds, although in every case control birds that had not received plasmochin developed typical avian malaria.

CONCLUSION

It is concluded that the infection of a canary by experimental needle inoculation with *Plasmodium cathemerium* (Hartman,

1927) can be prevented by intramuscular injections of plasmochin simplex in daily doses of from 0.00016 to 0.0002 gram.

AUTHOR'S NOTE

These experiments were reported by the author in Bangkok in December, 1930, as noted on page 32, paragraph 77, of the 8th Congress—Far Eastern Association of Tropical Medicine—Abstracts of Papers and Programme of Scientific Sessions—Bangkok, December 9 to 12, 1930.

Because of the important implications of these experiments as regards human malaria they were also discussed and summarized in a paper published by the American Journal of Tropical Medicine in July, 1931.

That this emphasis was justified has been shown by the fact that, on June 6, 1931, it was reported in the London Lancet, volume 220, No. 5623, that James had protected not only birds but also humans against malaria by using beprochin, a drug probably identical with plasmochin. It would appear that once again an experiment in avian malaria has been a reliable indicator as regards human malaria.

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ILLUSTRATIONS

TEXT FIGURES

FIG. 1. Diagram showing lines of transmission and attempted transmission of *Plasmodium cathemerium*. Experiments 1 to 4.
2. Plasmochin simplex, a prophylactic drug in avian malaria. First experiment.
3. Bird U12.
4. Bird U29.
5. Bird U33.
6. Plasmochin simplex, a prophylactic drug in avian malaria. Second experiment.
7. Bird U53.
8. Bird U54.
9. Bird U56.
10. Bird U60
11. Bird U61.
12. Plasmochin simplex, a prophylactic drug in avian malaria. Third experiment.
13. Bird U78.
14. Bird U79.
15. Bird U80.
16. Bird U81.
17. Bird U84.
18. Bird U85.
19. Bird U86.
20. Bird U87.

AVIAN MALARIA STUDIES, II

PROPHYLACTIC PLASMOCHIN VERSUS PROPHYLACTIC QUININE IN INOCULATED AVIAN MALARIA [1]

By Paul F. Russell

Of the International Health Division, Rockefeller Foundation

SEVEN TEXT FIGURES

INTRODUCTION

In the first paper of this series(1) three experiments were reported in which experimental inoculation of canaries with *Plasmodium cathemerium* (Hartman, 1927) was invariably prevented by intramuscular injections of plasmochin simplex in daily doses of from 0.00016 to 0.0002 gram. In all cases the attempt to infect the birds was made on the third day of the series of plasmochin injections.

In the above-mentioned first paper a discussion was given of plasmochin and an extensive bibliography was prepared. There was also a full description of the technic of injection, of the examination of blood smears, and of other pertinent phases of the work.

The fourth experiment herein reported was along the same general lines but with the following two notable changes in procedure.

In the first place instead of attempting infection always on the third day, in this case inoculations were made on various days as noted below. Secondly, a parallel series of birds was studied in which prevention was attempted by using quinine instead of plasmochin.

In all other respects the technic followed was that described in the first paper.(1) The mortality among the birds used in this experiment is shown in Table 1.

[1] Misses Amparo Capistrano and Filomena Villacorta, microscopists on the staff of malaria investigations, assisted in the examination of blood smears in this experiment. The work was done at the Bureau of Science, Manila, with the coöperation of the International Health Division of the Rockefeller Foundation.

TABLE 1.—*Mortality of birds in fourth experiment.*

	Number of birds.	Died in 10 days or less.		Died in 15 days or less.		Died in 30 days or less.		Alive after 170 days.	
		Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
Plasmochin series	10	1	10	1	10	3	30	4	40
Quinine series	20	1	5	6	30	11	55	6	30
Controls	10	4	40	5	50	8	80	2	20
Total	40	6	15	12	30	22	55	12	30

FOURTH EXPERIMENT—PLASMOCHIN SERIES (AUGUST 25 TO OCTOBER 20, 1930)

Ten canaries, J1 to J10, were each given an intramuscular injection of plasmochin simplex, 0.00016 gram, each morning for seven days at about 10 a. m. into the right breast muscle. Two birds, J1 and J2, were inoculated with infected blood into the left breast muscle at 3 p. m. of the third day. In a similar way J2 and J4 were inoculated on the fourth day; J5 and J6 on the fifth day; J7 and J8 on the sixth day; J9 and J10 on the seventh day (see fig. 1). The last pair, J9 and J10, therefore, received their inoculation of infected blood about five hours after the last injection of plasmochin. These two birds developed malaria on the tenth and eleventh days after inoculation and ran typical courses. The other eight birds, J1 to J8, all remained negative. Two control birds were injected each day with the same infected blood, in the same amount, and at the same time as the birds that had received plasmochin. These birds, J31 to J40, all became positive and had typical malaria, with the exception of J35 and J37, which died on the third and second days, respectively, after infection. (There remained at least one control bird for each day of infection.)

Of the birds receiving plasmochin, J4 and J8 died on the fifth and twelfth days, respectively, both negative. J1, J2, J3, J5, J6, and J7 remained negative for 26, 42, 25, 24, 40, and 39 days, respectively. Each was then proved to be a susceptible bird by an injection of positive blood. Each had a typical malaria course, J3 dying in the acute phase. Blood was taken from some of the plasmochin birds at intervals to test its infectiveness and invariably was noninfective, although in each case the recipient was subsequently proved to be susceptible. Table 2 lists these tests of infectivity.

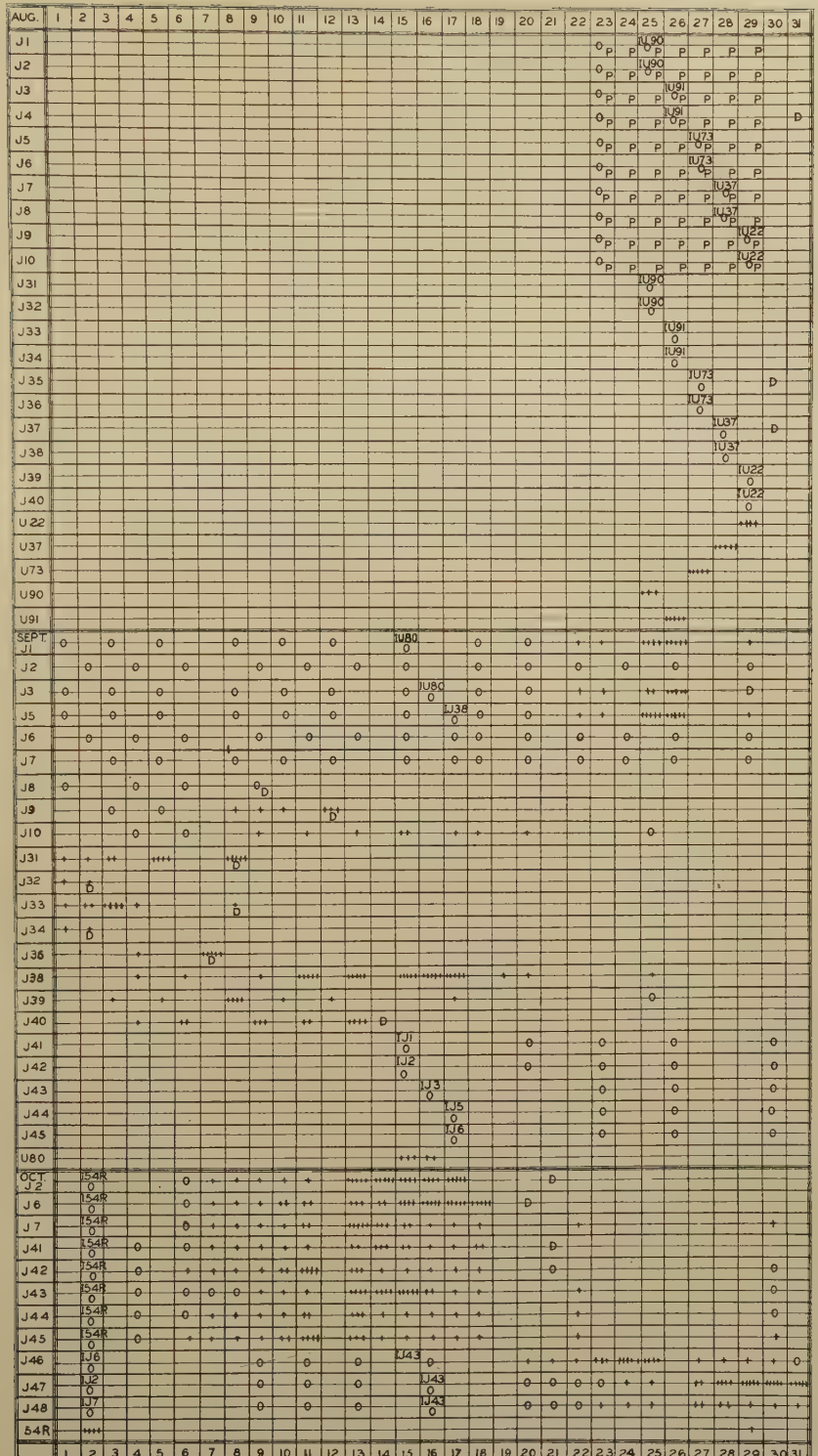

FIG. 1. Plasmochin simplex, a prophylactic drug in avian malaria. Fourth experiment.

TABLE 2.—*Tests of infectivity.*

Donor.	Days after attempted infection of donor.	Recipient.	Result.
J1	21	J41	Negative.
J2	21	J42	Do.
J2	38	J47	Do.
J3	21	J43	Do.
J5	21	J44	Do.
J6	21	J45	Do.
J6	36	J46	Do.
J7	35	J48	Do.

There follow the protocols of birds J1, J2, J3, J5, J6, J7, J8, J9, and J10. Text figs. 2 to 7 illustrate the protocols of birds J1, J2, J3, J5, J6, and J7.

FOURTH EXPERIMENT

Protocol 1. Bird J1.

August 23, 1930. Blood smear from *J1* negative (30 minutes).

August 23 to 29. *J1* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 25. *J1* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U90, known to be infective. An equal amount of the same mixture was given at the same time to birds J31 and J32, as controls. All injections were made into left breast muscle. J31 and J32 became positive September 1. J31 died September 8 of severe malaria.

August 25, and September 1, 3, 5, 8, 10, 12, 15, 18, and 20. Daily blood smears from *J1* negative. (Each smear searched for 30 minutes.)

September 15. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *J1* injected into J41, which had negative blood smears September 15 to 26 and October 2 to 6. J41 became positive October 7, which was five days after injection from 54R, which was known to be positive.

September 15. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird U80, known to be infective, injected into *J1*.

September 22 and 23, *J1* +; September 25, *J1* ++++; September 26, *J1* ++++++; September 29 and October 3, *J1* +; October 20, *J1* 0.

Protocol 2. Bird J2.

August 23, 1930. Blood smear from *J2* negative (30 minutes).

August 23 to 29. *J2* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 25. *J2* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U90, known to be infective. An equal amount of the same mixture was given at the same time to birds J31 and J32, as controls. All injections were made into left breast muscle.

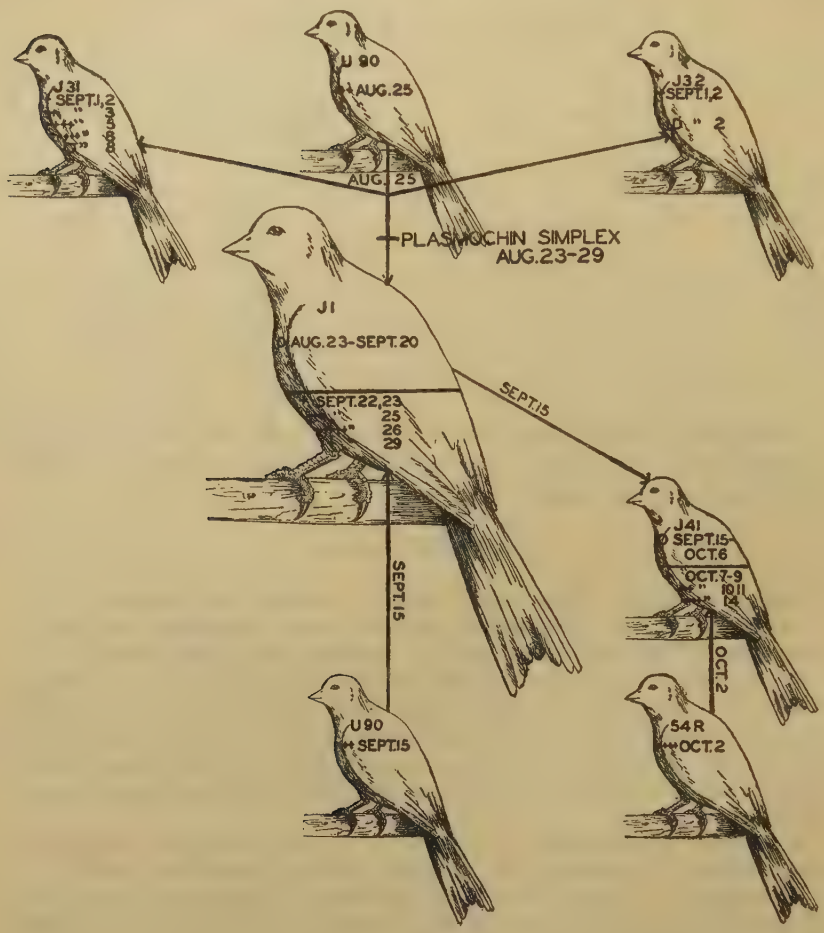

FIG. 2. Bird J1.

J31 and J32 became positive September 1. J31 died September 8 of severe malaria.

August 25, September 2, 4, 6, 9, 11, 13, 15, 18, 20, 22, 24, 26, 29, and October 2 and 6. Daily blood smears from *J2* negative. (Each smear searched for 30 minutes.)

September 15. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *J2* injected into J42, which had negative blood smears September 15 to October 4. J42 became positive October 6, which was four days after injection from 54R, which was known to be positive.

October 2. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *J2* injected into J47, which had negative blood smears October 2 to 23. J47 became positive October 24, which was eight days after injection from J43, which was known to be positive.

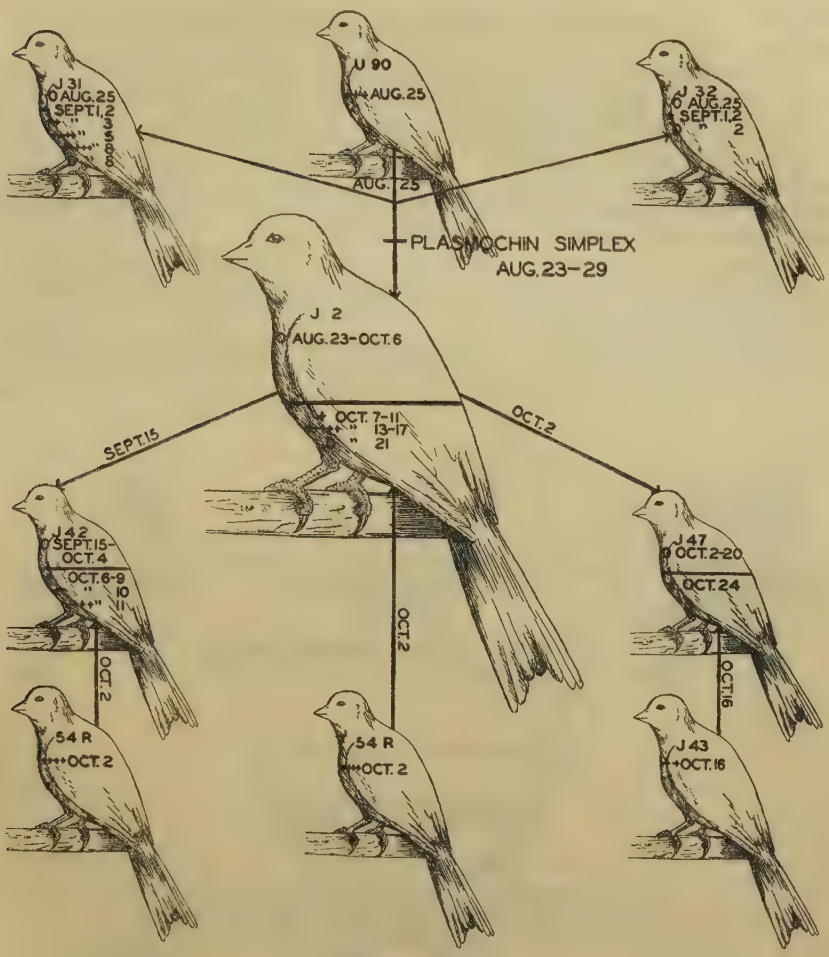

FIG. 3. Bird J2.

October 2. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird 54R, known to be infective, injected into *J2*.

October 7 to 11, *J2* +; October 13 and 14, *J2* +++++; October 15 and 16, *J2* ++++; October 17, *J2* +++++; October 21, *J2* died.

Protocol 3. Bird J3.

August 23, 1930. Blood smear from *J3* negative (30 minutes).

August 23 to 29. *J3* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 26. *J3* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U91, known to be infective. An equal amount of the same mixture was given at the same time to birds J33 and J34, as controls. All injections were made into left breast muscle.

J33 and J34 became positive September 1. J33 died September 8 of severe malaria.

August 26, and September 1, 3, 5, 8, 10, 12, 15, 16, 18, and 20. Daily blood smears from *J3* negative. (Each smear searched for 30 minutes.)

September 16. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *J3* injected into J43, which had negative blood smears September 16 to October 8. J43 became positive October 9, which was seven days after injection from 54R, which was known to be positive.

September 16. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird U80, known to be infective, injected into *J3*.

September 22, 23, *J3* +; September 25, *J3* ++; September 26, *J3* +++++; September 29, *J3* died.

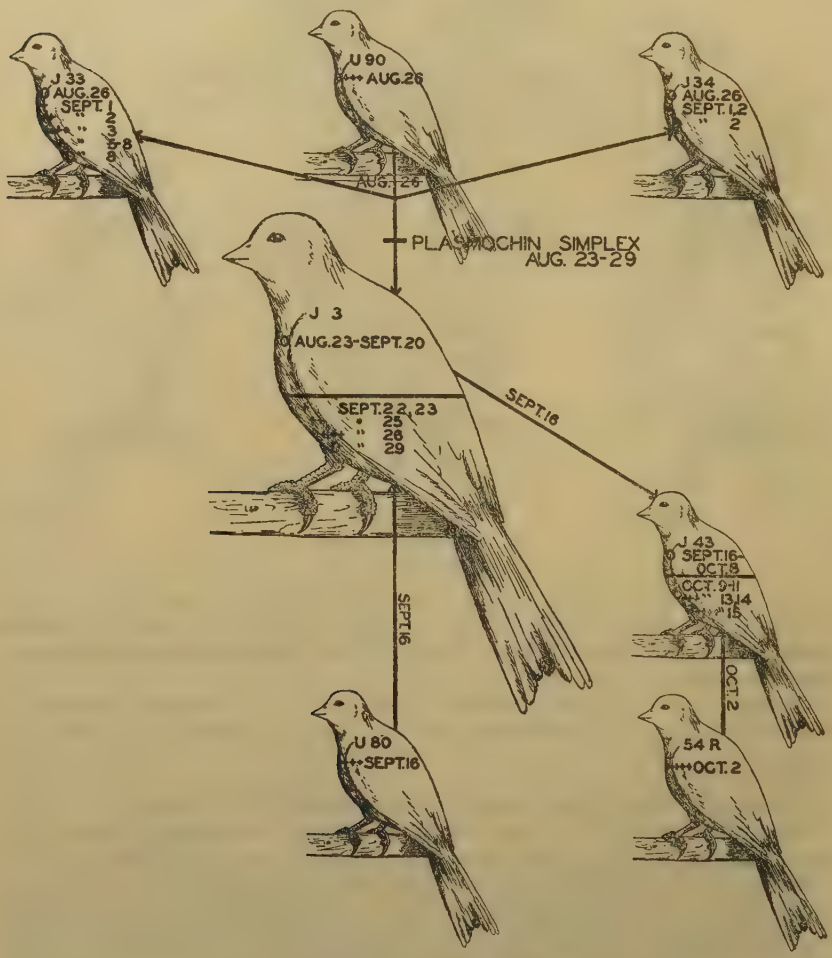

FIG. 4. Bird J3. Fourth experiment.

Protocol 4. Bird J5.

August 23, 1930. Blood smear from *J5* negative (30 minutes).

August 23 to 29. *J5* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 27. *J5* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U73, known to be infective. An equal amount of the same mixture was given at the same time to birds J35 and J36, as controls. All injections were made into left breast muscle. J36 became positive September 4 and died September 7 of severe malaria. (J35 died August 30, negative.)

August 27, and September 1, 3, 5, 8, 10, 12, 15, 17, 18, and 20. Daily blood smears from *J5* negative. (Each smear searched for 30 minutes).

September 17. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *J5* injected into J44, which had negative blood smears September 17 to October 6. J44 became positive

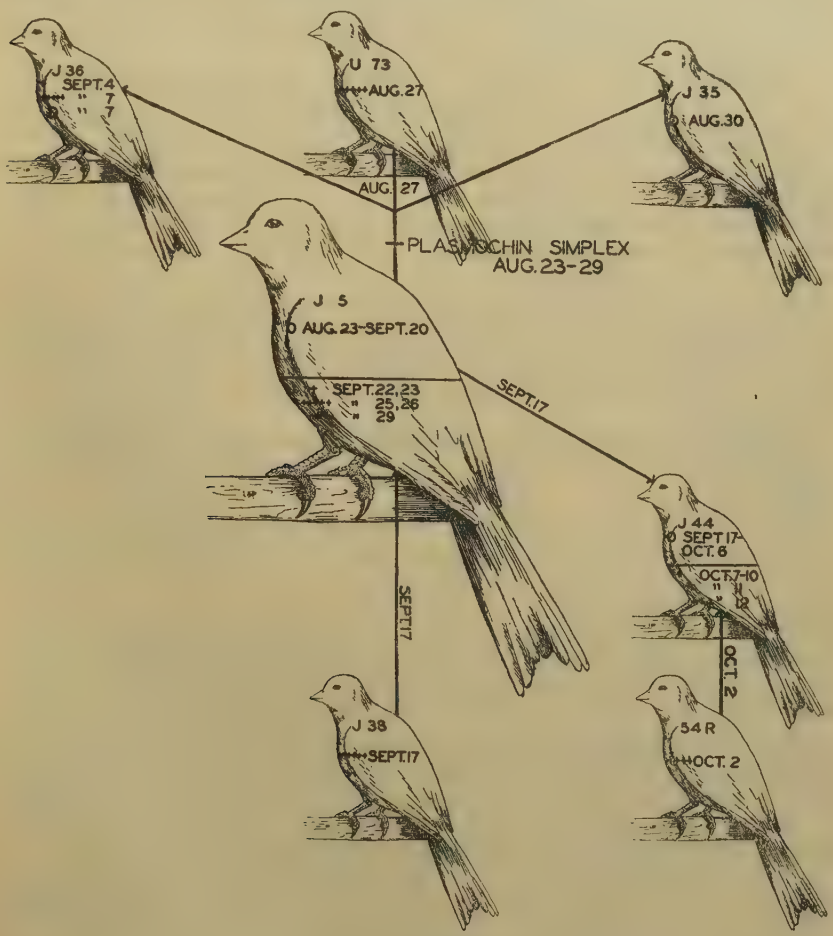

FIG. 5. Bird J5.

October 7, which was five days after injection from 54R, which was known to be positive.

September 17. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird J38, known to be infective, injected into *J5*.

September 22 and 23, *J5* +; September 25 and 26, *J5* +++++; September 29, *J5* +; October 3 and 20, *J5* 0.

Protocol 5. Bird J6.

August 23, 1930. Blood smear from *J6* negative (30 minutes).

August 23 to 29. *J6* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 27. *J6* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U73, known to be infective. An equal amount of the same mixture was given at the same time to birds J35 and J36, as controls. All injections were made into left breast muscle. J36 became positive September 4 and died September 7 of severe malaria. (J35 died August 30, negative.)

August 27, September 2, 4, 6, 9, 11, 13, 15, 17, 18, 20, 22, 24, 26, and 29, and October 2 and 6. Daily blood smears from *J6* negative. (Each smear searched for 30 minutes.)

September 17. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *J6* injected into J45, which had negative blood smears September 17 to October 4. J45 became positive October 6, four days after injection from 54R, which was known to be positive.

October 2. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *J6* injected into J46, which had negative blood smears October 2 to 16. J46 became positive October 20, which was five days after injection from J43, which was known to be positive.

October 2. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird 54R, known to be infective, injected into *J6*.

October 7 to 9, *J6* +; October 10 and 11, *J6* ++; October 13, *J6* +++; October 14, *J6* ++; October 15, *J6* ++++; October 16, 17, and 18, *J6* + + + + +; October 20, *J6* died.

Protocol 6. Bird J7.

August 23, 1930. Blood smear from *J7* negative (30 minutes).

August 23 to 29. *J7* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 28. *J7* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U37 known to be infective. An equal amount of the same mixture was given at the same time to birds J37 and J38 as controls. All injections were made into left breast muscle. J38 became positive September 4. (J37 died August 30.)

August 28, September 3, 5, 8, 10, 12, 15, 17, 18, 20, 22, 24, 26, 29, and October 2 and 6. Daily blood smears from *J7* negative. (Each smear searched for 30 minutes.)

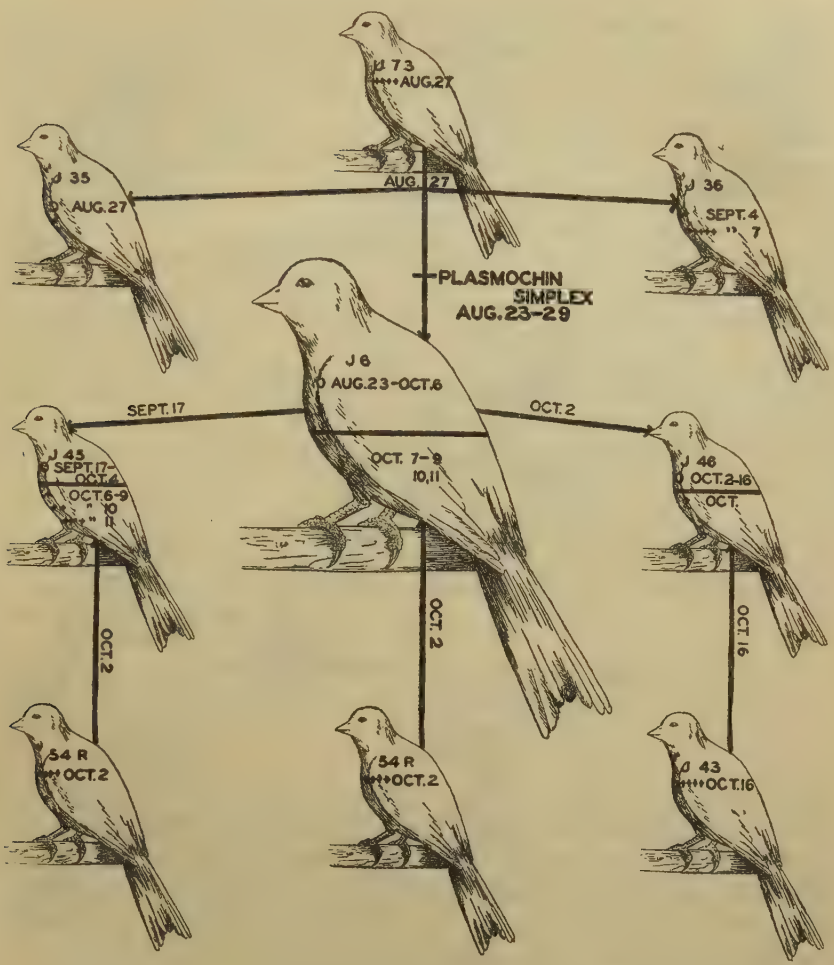

FIG. 6. Bird J6.

October 2. Three-tenths cubic centimeter of physiologic saline solution mixed with 5 to 7 drops of blood from *J7* injected into J48, which had negative blood smears October 2 to 22. J48 became positive October 23, which was seven days after injection from J43, which was known to be positive.

October 2. Three-tenths cubic centimeter physiologic saline solution mixed with 5 to 7 drops of blood from bird 54R, known to be infective, injected into *J7*.

October 7 to 10, *J7* +; October 11, *J7*, + +; October 13, *J7* + + + + +; October 14, *J7* + + +; October 15, *J7* + +; October 16–22, *J7* +.

Protocol 7. Bird J8.

August 23, 1930. Blood smear from *J8* negative (30 minutes).

August 23 to 29. *J8* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

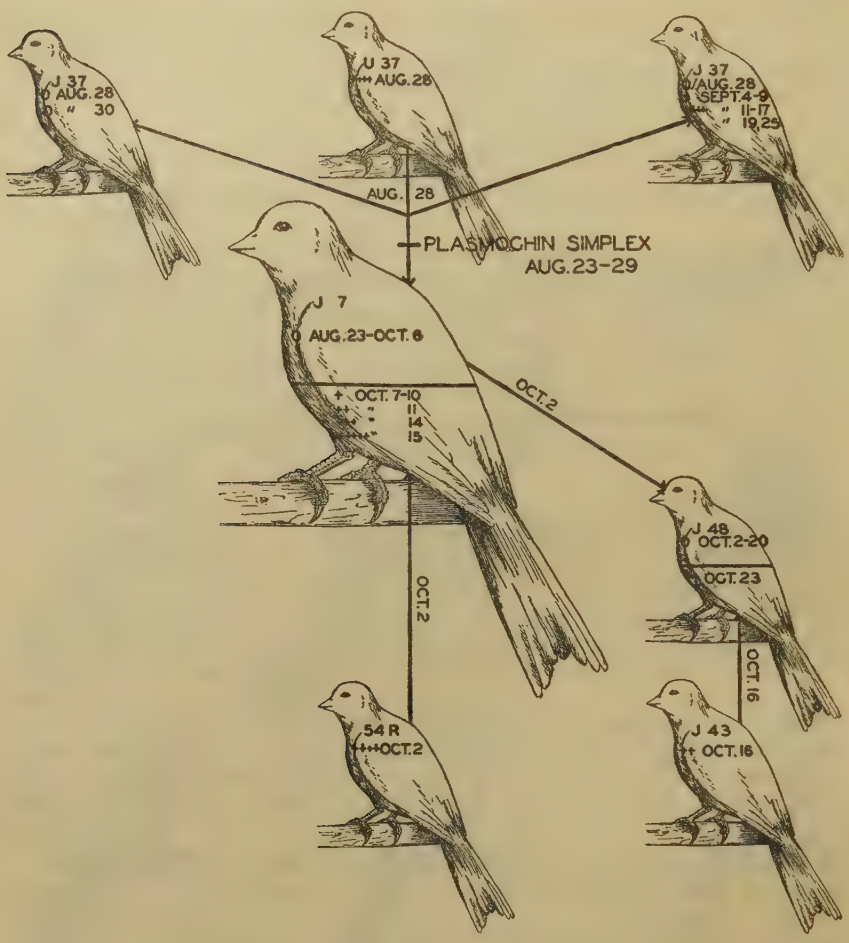

FIG. 7. Bird J7.

August 28. *J8* received 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U37, known to be infective. An equal amount of the same mixture was given at the same time to birds J37 and J38, as controls. All injections were made into left breast muscle. J38 became positive September 4. (J37 died August 30.)

August 28, September 1, 4, 6, 9. Daily blood smears from *J8* negative. (Each smear searched for 30 minutes.)

September 9. *J8* died.

Protocol 8. Bird J9.

August 23, 1930. Blood smear from *J9* negative (30 minutes).

August 23 to 29. *J9* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 29. *J9* received at 3 p. m. 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U22, known to be

infective. An equal amount of the same mixture was given at the same time to birds J39 and J40, as controls. All injections were made into left breast muscle. J39 became positive September 3. J40 became positive September 4.

August 29, September 3, 5. Daily blood smears from *J9* negative. (Each smear searched for 30 minutes.)

September 8 to 10. *J9* +; September 12, *J9* +++; September 12, *J9* died.

Protocol 9. Bird J10.

August 23, 1930. Blood smear from *J10* negative (30 minutes).

August 23 to 29. *J10* received 0.00016 gram plasmochin simplex by intramuscular injection about 10 a. m. each day into right breast.

August 29. *J10* received at 3 p. m. 0.3 cubic centimeter physiologic saline solution containing 5 to 7 drops of blood from bird U22, known to be infective. An equal amount of the same mixture was given at the same time to birds J39 and J40, as controls. All injections were made into left breast muscle. J39 became positive September 3. J40 became positive September 4.

August 29 and September 4 to 6. Daily blood smears from *J10* negative. (Each smear of blood searched for 30 minutes.)

September 9 to 13, *J10* +; September 15, *J10* ++; September 17 and 20, *J10* +; September 25, *J10* 0; October 20, *J10* +.

FOURTH EXPERIMENT—QUININE SERIES (AUGUST 25 TO OCTOBER 20, 1930)

DRUG

The drug used in these experiments was quinine dihydrochloride Lilly sold as a sterilized solution for intramuscular use. It was purchased at a local pharmacy in boxes of 12 ampoules of 1 cubic centimeter each. According to the label each ampoule contained 0.25 gram of quinine dihydrochloride in 1 cubic centimeter solution. This solution taken from the ampoules was diluted for this experiment with distilled water, and an attempt was made to determine a dose that would not produce marked symptoms of drug toxæmia in the birds.

Manwell(2) found the minimum lethal dose for quinine to be 0.006 gram for a bird of average weight and the minimum lethal dose of plasmochin to be 0.001 gram. His birds had an average weight of 16.5 grams. The birds used in the experiments reported in this and the first paper of the series averaged for 100 birds 15.98 grams in weight. Manwell(2) in his therapeutic studies used doses of 0.000132 gram of plasmochin dissolved in 0.1 gram of solution and 0.00075 gram of quinine (salt not specified) in 0.00075 gram of solution. This dose of quinine he subsequently increased to 0.001 gram in 0.1 gram of solution.

It should be noted that in Manwell's work the drugs were given orally by œsophageal tube, whereas in the experiments here reported the drugs—quinine dihydrochloride and plasmochin simplex—were given intramuscularly.

The dose of plasmochin as already discussed in the experiments here reported was 0.00016 to 0.0002 gram given in 0.1 cubic centimeter amounts.

The dose of quinine dihydrochloride finally determined as one which would not give symptoms was 0.0005 gram given in 0.05 cubic centimeter amounts. To each ampoule of the solution as purchased 24 cubic centimeters of distilled water were added and 0.05 cubic centimeter of the resulting solution constituted a dose. (Consult also Sergent.(4)) There was little or no necrosis of muscle at the site of injection. Care was taken to make deep injections well forward. The mortality in the 10-day period beginning with the first injection of quinine was 5 per cent in the birds receiving quinine and 40 per cent in the controls which received no drugs. (See Table 1.)

PROCEDURE

Twenty canaries, J11 to J30, were each given an intramuscular injection of quinine dihydrochloride, 0.0005 gram, each morning for seven days at about 10 a. m. into the right breast muscle. Four birds, J11, J12, J13, and J14, were inoculated with infected blood from bird U90 into the left breast muscle at 3 p. m. of the third day. In a similar way J15, J16, J17, and J18 were inoculated from bird U91 on the fourth day; J19, J20, J21, and J22 from bird U73 on the fifth day; J23, J24, J25, and J26 from bird U37 on the sixth day; and J27, J28, J29, and J30 from bird U22 on the seventh day. It will be noted by reference to the protocols of the plasmochin series in this paper that the same donor bird was used each day for the two birds being protected by plasmochin and the four in which an attempt was being made to protect by quinine.

The injections were all made with blood-saline mixture taken from the same vial and given in the same amount—0.3 cubic centimeter—as described in the first paper. The control birds on the third day were J31 and J32; on the fourth day J33 and J34; on the fifth day J35 and J36; on the sixth day J37 and J38; on the seventh day J39 and J40. These birds were also infected from the same corresponding vials using the same blood-saline mixture in the same amount given in the same way. The same

controls, therefore, served for both the quinine and the plasmochin series and these two series in turn acted as controls to each other.

RESULTS

It will not be necessary to give detailed protocols of each bird receiving quinine because, with the exception of birds J19 and J30, which died five days after inoculation, and controls J35 and J37, which also died soon after inoculation, all of the controls and all of the birds that had been given quinine as a preventive became infected. Quinine failed completely to prevent infection in every case. See Table 3 for detailed results of blood examinations in these birds and contrast them with the negative results in the plasmochin series in all but the two birds infected on the last day of their series of plasmochin injections.

TABLE 3.—*Quinine series.*

Number of bird.	Date inoculated, 1930.	Parasites first seen, 1930.	Number of days 4 or 5 plus.	Date of death.
J11	August 25	September 1	1	September 8, 1930.
J12	do	do	1	October 17, 1930.
J13	do	September 2	0	September 23, 1930.
J14	do	September 1	0	October 6, 1930.
J15	August 26	September 3	0	September 3, 1930.
J16	do	do	2	Alive February 18, 1931.
J17	do	September 2	4	September 15, 1930.
J18	do	do	2	Alive February 18, 1931.
J19	August 27			August 27, 1930.
J20	do	September 3	3	September 13, 1930.
J21	do	September 4	0	Alive February 18, 1931.
J22	do	do	3	September 12, 1930.
J23	August 28	September 5	0	September 6, 1930.
J24	do	do	0	Do.
J25	do	September 6	0	Do.
J26	do	September 4	1	Alive February 18, 1931.
J27	August 29	September 5	0	Do.
J28	do	do	0	Do.
J29	do	September 4	0	September 11, 1930.
J30	do			September 3, 1930.

The fact that the average prepatent period in the birds given quinine was 7.4 days and in the controls was 6.5 days is of doubtful significance because no attempt was made to adjust the quantity of the infective blood-saline inoculum to the size of the birds. The same dose of 0.3 cubic centimeter was given in every case as noted in the first paper of this series.(1)

Boyd(3) found that the prepatent period is a function of the size of the inoculum.

SUMMARY

Two experiments are reported in which attempts were made to prevent the infection of canaries following needle inoculations with *P. cathemerium* (Hartman, 1927). In the first experiment plasmochin simplex and in the second experiment quinine dihydrochloride was given in daily intramuscular doses for a week. Infection was attempted in some birds on the third day; in others on the fourth, or fifth, or sixth, or seventh day. The birds that had had plasmochin for seven days and were infected on the seventh day, five hours after their last dose of plasmochin, became infected, as did all of the birds receiving quinine. When infection was attempted on the third, fourth, fifth, and sixth days of the plasmochin series the attempt invariably failed.

CONCLUSION

1. It is concluded that the infection of a canary by experimental needle inoculation with *P. cathemerium* (Hartman, 1927) can be prevented by intramuscular injections of plasmochin simplex in daily doses of 0.00016 gram, provided that the bird receives at least one dose of plasmochin subsequent to receiving the infective inoculum.

2. It is concluded that the protective power of plasmochin in these needle inoculations is transitory and does not persist as long as five hours. (It may, therefore, be reasonable to conclude as a corollary that the protective power of plasmochin in experimentally inoculated malaria in birds is more therapeutic than preventive.)

3. Finally, it is concluded that quinine dihydrochloride in daily intramuscular doses of 0.0005 gram will not protect birds from experimental needle inoculations with *P. cathemerium* (Hartman, 1927).

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4. Sergent, Et. and Ed. Ann. d. l'Institut Pasteur 35 (1921) 1–17.

ILLUSTRATIONS

TEXT FIGURES

FIG. 1. Plasmochin simplex, a prophylactic drug in avian malaria. Fourth experiment.
2. Bird J1.
3. Bird J2.
4. Bird J3.
5. Bird J5.
6. Bird J6.
7. Bird J7.

MALARIA TRANSMISSION IN THE PHILIPPINES, V

ON THE MATURATION OF THE OVA OF ANOPHELES FUNESTUS GILES [1]

By C. Manalang

Of the Philippine Health Service, Manila

ONE TEXT FIGURE

In the 7th Congress, Far Eastern Association of Tropical Medicine, held at Calcutta (December, 1927), James, Nicol, and Shute [2] reported higher mortality of *Anopheles maculipennis* Mg. in some months than in others, as observed during a period of three and one-half years on forty-one batches of artificially infected mosquitoes in England. In June less than 2 per cent (should be less than 20 per cent or 17 per cent, an error in the decimal; see their table) survived to be infective, while in October at least 50 per cent would be available. By field observation they explained this to be due to the process of egg maturation and deposition, which caused high mortality. Their observations agreed with those of Swellengrebel in Holland [3] in regard to the period of egg maturation and oviposition of *maculipennis* (spring and summer) when no positive mosquitoes were found, and the autumn and winter months when the ova were not developed but with natural malaria infection in the mosquitoes. Their conclusions are:

> The lessons of these observations from the point of view of the spread of malaria seem to be (1) that in the future we must endeavor to correlate the seasonal incidence of primary malaria, not with the seasonal prevalence of mosquitoes concerned but with the seasonal prevalence of the individuals which live long enough to be transmitters. In June, there may be an enormous number of adult *maculipennis* in a malarious place but if we know that during that month less than 2% [should be less than 20 per cent] live long enough to become transmitters of the disease, their abundance is not so important. Obviously, it is much less important than a smaller abundance in August or September; the simple calculation from

[1] From the field laboratory, division of malaria control, Philippine Health Service, Tungkong Manga, Bulacan.

[2] Trans. 7th Congress F. E. A. T. M. 2 (1927) 712–717.

[3] Malaria in the Kingdom of the Netherlands. Report to the malaria subcommittee of the Health Committee of the League of Nations (1927).

our figures that 100 mosquitoes in September are equal in importance to 3,000 in June [this should be 300, see their table] does not by any means express the true difference because the September mosquitoes will live several months while the June mosquitoes will live at the most only a few weeks; (2) If the process of egg maturation and oviposition is such an important cause of death that it almost entirely prevents the transmission of malaria by anopheles during the months of its occurrence, the number of broods that each species has in different localities and periods of the year during which maturation of eggs and oviposition occurs ought to be worked out much more carefully than has hitherto been attempted in many places. The results may provide a clue to the explanations of some observations on malarial incidence which are at present obscure.

Boyd,[4] using a standard measure of *A. quadrimaculatus* Say density (mosquitoes caught per man-hour search) noticed explosive increases in density, particularly those of the males, and concluded that in the latitude observed in southwestern Georgia this species may have from eight to ten annual generations, or a monthly generation, excepting in January and February. His records of dissection led him to conclude that "(a) The occasions when gland infections have been found have been preceded by the detection of stomach infections, and (b) Referring to the hypothetical brood curves, the stomach infections occurred at a period when the density of a generation has been at its maximum, while gland infections were found at the period when the brood was frankly in decline." As to ovarian development he found nulliparous females most abundant when the brood is on its upward phase and multiparous females encountered when the brood is on the wane. Boyd and Weathersbee,[5] observing along the coast of North Carolina (36° north latitude) found that in *quadrimaculatus* and *punctipennis* "gravid females were relatively high in number in the early winter and until oviposition began in January and February. Digestion of blood and development of the ovaries proceeds slowly thruout winter, the gravid females tending to withhold oviposition until the temperature is favorable."

Boyd [6] in a more recent article (p. 457) says:

No gravid females of *quadrimaculatus* were found during winter period. This shows that during the winter the distended abdomens of stage *e* females (Grassi and Sella) are to be attributed to an hypertrophied fat body. No instance of reproductive activity during the coldest winter month was

[4] Am. Journ. Hyg. 7 (1927) 264–275.
[5] Am. Journ. Hyg. 9 (1929) 682–694.
[6] Am. Journ. Hyg. 12 (1930) 449–466.

found. The statement in Boyd and Weathersbee (8) that "the majority of *A. quadrimaculatus* found in unoccupied places were gravid" is incorrect in the light of this information. It appears, therefore, that the imagines of *quadrimaculatus* encountered during the fall or winter periods are destined for, or are actually undergoing hibernation.

His table (p. 463) of seasonal distribution of infected specimens for 1926, 1927, and 1928 shows that the infections were found between June and October.

King's [7] twelve months' observation on natural malaria infection in the vicinity of Mound, Louisiana, records no infections in 1,375 *quadrimaculatus* caught in winter (November to April), but 12, or 1.96 per cent, of the 611 caught in summer (May to October) were infected.

The data for the present paper were collected from September, 1927, to August, 1929, in the La Mesa and South Portal camps of the Novaliches water project.

TABLE 1.—*Anopheles funestus caught in two years at La Mesa and South Portal giving percentages of insects with matured ova and the rates of infection.*[a]

Month.	Mosquitoes caught and dissected.			Stomach positive.		Salivary gland positive.	
	Total.	With mature ova.					
			Per cent.		*Per cent.*		*Per cent.*
January	932	51	5.4	11	1.2	8	0.8
February	327	25	7.6	6	1.8	3	0.9
March	878	55	6.2	15	1.7	14	1.6
April	668	115	17.2	4	0.6	9	1.3
May	686	71	10.3	18	2.6	19	2.8
June	782	103	13.1	8	1.0	11	1.4
July	883	98	11.1	23	2.6	10	1.1
August	571	116	20.3	17	3.0	7	1.2
September	1,058	48	4.5	8	0.7	8	0.7
October	1,190	105	8.8	12	1.0	2	0.1
November	767	33	4.4	8	1.0	4	0.5
December	803	47	5.8	14	1.7	9	1.1

[a] Matured ova in a positive mosquito were found in only one case (salivary gland) among almost 300 positives observed from six areas. Engorged stomach with oöcyst was not uncommon. In 15 cases both stomach and salivary glands were infected.

The table gives the monthly number of *A. funestus* Giles dissected, the number and percentage with ova (float and chitinous structures formed), and the stomach and gland infections. The

[7] Am. Journ. Hyg. 1 (1921) 35–39.

graph (fig. 1) shows a rise in mosquito infection coinciding with the months with the high rate of matured ova.

COMMENTS

The findings on *funestus* are, therefore, diametrically opposed to those of James in England and Swellengrebel in Holland that oviposition of *maculipennis* prevented malaria transmission due to shortening of its life.

The findings of *quadrimaculatus* by American investigators also do not agree with those of the Europeans.

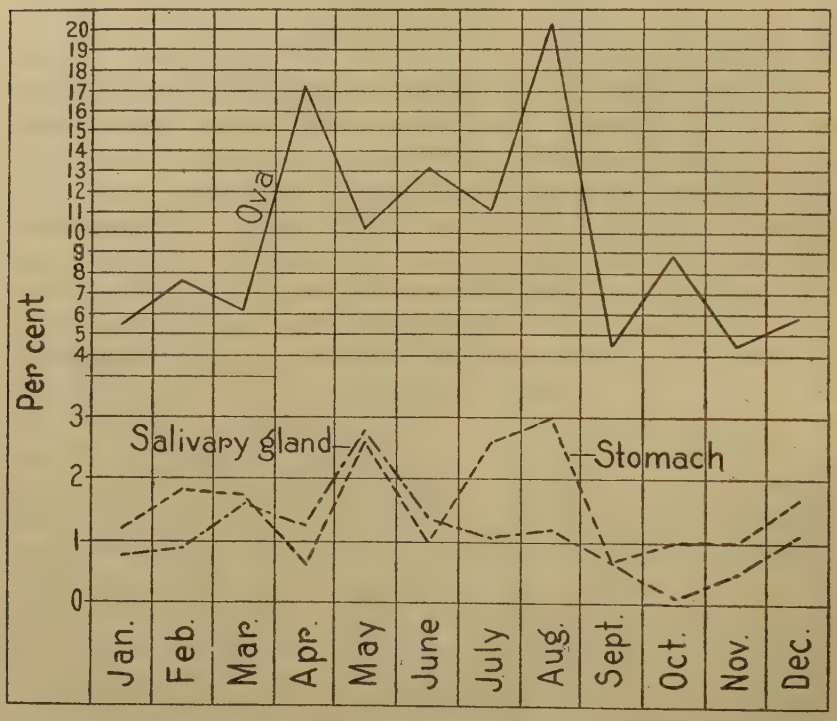

FIG. 1. Percentages of *Anopheles funestus* Giles with ova and with stomach and salivary-gland infections. La Mesa and South Portal camps, Novaliches water project, Luzon, September, 1927, to August, 1929.

The coincidence of higher malaria-infection rates in *funestus* with the higher rate of the females with matured ova indicates that this species not only survives oviposition but that the period with the maximum rate of matured ova is the period of maximum malaria transmission. This seems logical on biological grounds, and as indicated in my preceding article, the rates of infection in *funestus* rose with rainfall, temperature, and humidity. These meteorological factors undoubtedly ac-

celerate egg development and induce the mosquito to seek blood for the maturation of the eggs; consequently to bite man and become infected with gametes. When the ova mature and are deposited, more immature ova develop with a desire for human blood, so that with sporozoites in the salivary glands the mosquito bites man and infects him.

SUMMARY

1. Data on malaria infection and maturation of the ova of *Anopheles funestus* in La Mesa and South Portal camps of the Novaliches water project, Luzon, show higher rates of the former during the period of high rates of the latter, a finding opposite to those of James in England and Swellengrebel in Holland, who held that egg maturation and oviposition prevent malaria transmission due to the shortened life of *A. maculipennis*.

2. Findings on *A. quadrimaculatus* by American workers agree with the findings in the Philippines.

3. The findings on *A. funestus* seem logical on biological grounds.

ILLUSTRATION

TEXT FIG. 1. Percentages of *Anopheles funestus* Giles with ova and with stomach and salivary-gland infections. La Mesa and South Portal camps, Novaliches water project, Luzon, September, 1927, to August, 1929. 369

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MALARIA TRANSMISSION IN THE PHILIPPINES, VI

THE DARK-NIGHT FACTOR [1]

By C. Manalang

Of the Philippine Health Service, Manila

It is a general practice among anopheles-mosquito experimenters to cover the mosquito cage with black cloth if it is desired that the mosquitoes bite during the day or to expose the patient to them at night.

During December, 1927, and May and June, 1928, it was noticed on *Anopheles funestus* Giles dissection records from South Portal camp of the Novaliches water project, that malaria infection coincided with the new-moon period of the month, or a few days before or after the new moon.

To determine the relation between the positive catches and the moon periods, the calendar was divided into two periods of fifteen days each; namely, the full-moon period (seven days before and seven days after the full moon) and the new-moon period (seven days before and seven days after the new moon). In January, 1928, these two periods had an interval of one day, the fifteenth, while the new-moon period in the last half of the month overlapped one day with the full-moon period of February, on January 30; in March, the interval was on the fourteenth and the overlap on the twenty-ninth; in April, the interval was three days (the thirteenth, fourteenth, and fifteenth) and the overlap was two days, the twenty-ninth and thirtieth; in May, the overlap was on the twelfth; in June, the interval was on the twenty-sixth; in July, the overlap was on the tenth; in August, the overlap was on the eighth, with the interval on the twenty-third; in September, the overlap was on the seventh; in October the overlap was on the sixth; and in November, the overlap was on the fifth and the interval on the twenty-first.

[1] From the field laboratory, division of malaria control, Philippine Health Service, Tungkong Manga, Bulacan.

The mosquito data in South Portal from December, 1927, to December, 1928, inclusive, are used in the present paper. These data contain the largest number of *funestus* infections registered in all the camps studied. Dissection findings were entered on the date of capture and not on the date of dissection. They were kept for several days after capture to allow positive blood meals to develop.[2] Positives falling on the overlapping dates were credited to the period before it. Two positives were thus credited to the new-moon period and three to the full-moon period. No positives were found in the intervening dates between the two periods except one on April 13, the eighth day after the full moon on April 5, which was credited to the full-moon period, there being an interval of three days.

Table 1 shows the distribution of positives in these periods and shows the influence of the darkness of the new-moon period on the number of infected *funestus*.

The darkness of the night was not recorded at the La Mesa camp, so it is not possible to correlate the mosquito findings during the dry months, December to April. The rain observation chart, however, indicated rain-gauge readings at 6 a. m. and 2 p. m. and noted the beginning and duration of the rain during the day or night. There was no record of the rainless but dark (cloudy) nights during the full-moon periods. Investigation of the rainy nights during the rainy months showed that thirty-two positives of the total seventy-two caught during the full-moon period, as shown in Table 1, were caught during twenty-one rainy nights from May 4 to November 27. Since these nights were usually dark, the relation of *funestus* infection and dark night is very clear.

Table 2 shows the number of infected *funestus* caught during dark and bright nights. Dark cloudy nights from December to April (dry season) and dark rainless nights during the full-moon period are not known.

By including the period, December, 1927, to April, 1928, when the darkness or brightness of the night was based only on the

[2] In an unsuccessful attempt to compare laboratory infectivity of different anopheline species, ten carriers were bitten by 1,157 mosquitoes with the following result: One *vagus* with two matured oöcysts died on the eighth day after the infective meal; one *funestus* with three matured cysts on the fourth day; one *karwari* with four matured oöcysts on the sixth day; and one *ludlowi* with twenty-two matured oöcysts on the seventh or ninth day after the infective meal.

new- and full-moon periods on the calendar, 80 per cent of the infected *funestus* were caught in the dark-night period. Excluding the December to April data (dry months), 87 per cent of the positives were caught during the known dark nights (with or without rain) and 13 per cent during the rainless nights, some of which, however, might have been bright or cloudy. Therefore, a susceptible has at least four times more chance of contracting malaria during the dark than during the bright nights, or 80 per cent of the infections are acquired during the dark nights. The moon has apparently no influence.

TABLE 1.—*Malaria in funestus distributed in the two moon periods.*

Month.	Number of positives.	
	New-moon period.	Full-moon period.
December, 1927	6	0
January, 1928	7	7
February	3	4
March	7	6
April	7	4
May	21	10
June	12	5
July	23	4
August	14	9
September	10	11
October	8	3
November	1	2
December	7	7
Total [a]	126	72
Per cent	63.6	36.4

[a] Positive stomachs, 113; positive salivary glands, 85.

COMMENTS

Table 3 shows the number of mosquitoes caught, the number of days employed in catching, and the average daily catch for the dark and bright nights (by calendar) and shows an average of twenty-three for the former and twenty for the latter. The twenty-one rainy nights of the full-moon periods from May to November gave a daily average of twenty-three *funestus*. So there was no increase in density during the dark nights, whether rainy or not. Larger numbers of them have been observed to enter the trap between 10 p. m. and 2 a. m. than at other times.

TABLE 2.—*Number of infected funestus caught during dark and bright nights.*[a]

Month	Number of positives.	
	Dark-night period.	Bright-night period.
December, 1927	6	0
January, 1928	7	7
February	3	4
March	7	6
April	7	4
May	24	7
June	16	1
July	23	4
August	23	0
September	19	2
October	11	0
November	3	0
December	9	5
Total	158	40
Per cent	80	20

[a] The number of cloudy or dark nights during full-moon periods of dry months, from December, 1927, to April, 1928, inclusive, is not known. The number of rainless but dark (cloudy) nights during the full-moon period is also not known.

Anopheles funestus, like the other anophelines, undoubtedly prefers to bite at night, as observed in experimental work. The camp people probably retire earlier during dark or rainy nights and give the mosquitoes an undisturbed chance to bite.

Culicines and some anophelines (*vagus* and *ludlowi*) are attracted by yellowish lantern light. At one of the Tungkong Manga laboratory traps, *A. philippinensis* came by the hundreds on two nights, attracted by the bright white light from an Aladdin lamp. *Funestus* were caught in South Portal traps with or without lantern light, so that it could not be said that a light in the trap guided them during dark nights. In the laboratory traps at Tungkong Manga, about 400 *funestus* were caught during the past ten months without using light.

The influence of bright or colored lights has not been tested. The study of illumination and transmission may give some clue to the factors causing prevalence of malaria in the rural, newly developed, out-of-the-way districts in the Philippines.

TABLE 3.—*Comparative density of mosquitoes between the two moon periods.*

Month.	New moon.			Full moon.		
	Number caught.	Number of days.	Daily average.	Number caught.	Number of days.	Daily average.
December, 1927	157	5	31	17	1	17
January, 1928	396	9	44	355	11	33
February	83	8	10	140	7	20
March	306	13	33	205	10	20
April	332	13	26	171	8	21
May	286	13	22	210	10	21
June	239	12	20	235	10	23
July	357	12	30	207	10	21
August	197	11	18	371	12	31
September	270	12	22	109	12	9
October	340	13	26	219	13	17
November	99	8	12	208	12	17
December	134	11	12	169	10	17
				52	8	7
Total	3,196	140		2,668	134	
Daily average			23			20

SUMMARY

1. Data collected during thirteen months of study of natural malaria infection of *A. funestus* in South Portal camp of the Novaliches water project show that at least 87 per cent of those infected were caught during the dark nights. Malaria transmission in the locality observed was at least four times more during the dark than during the bright nights, and the chance of contracting the disease was eighty times out of a hundred during the dark nights.

CAUSES OF IRRITATION UPON INJECTION OF IODIZED ETHYL ESTERS OF HYDNOCARPUS-GROUP OILS [1]

By Howard Irving Cole

Chief Chemist, Culion Leper Colony, Philippine Health Service

At the recent conference of leprologists held under the auspices of the Leonard Wood Memorial for the Eradication of Leprosy, the majority of the delegates agreed that the ethyl esters of hydnocarpus-group oils are among the most active drugs at present available in the treatment of leprosy. Several leprologists stated that, by their methods of preparation, a nonirritating oil was essential for the production of esters of low-irritant quality. It is not always possible, however, for institutions situated many thousands of miles from the sources of supply to obtain oil that is fresh and nonirritating. It, therefore, becomes of prime importance that a method be devised by which even intensely irritating oils may be utilized for making relatively nonirritating ethyl esters. In order to accomplish this, it is necessary to take into consideration all the factors that may cause irritation and vary the method of preparation of the esters accordingly.

It has previously been found [2] that irritant properties of ethyl esters may be reduced by (1) elimination of free fatty acids; (2) elimination of decomposition products due to heating or chemical treatment; (3) elimination of volatile and nonvolatile impurities; and (4) addition of 0.5 per cent iodine.

Free fatty acids can be reduced to a minimum (less than 0.2 per cent) by careful neutralization with sodium hydroxide and very thorough washing. Free fatty acids are undoubtedly one of the main causes of irritation. To be certain that the amount present is less than 0.2 per cent, titration with tenth normal alkali should be made a part of the routine procedure for the preparation of the ethyl esters.

[1] Published with the approval of the Director of Health.

[2] Cole, Philip. Journ. Sci. 40 (1929) 503.

Decomposition products, formed upon heating or strong chemical treatment, and other volatile impurities can be largely blown out by steam.

If the esters are distilled, nonvolatile impurities and decomposition products remain in the still as residue. The distilled esters are decidedly more limpid than the undistilled, due probably to the fact that the latter contain some unchanged oil.

Addition of 0.5 per cent iodine markedly reduces the irritant effect of the ethyl esters providing that the method of iodization described below is strictly followed, in which case, the iodine is in the combined form. The presence of free iodine causes irritation.

The inherent irritant quality due to the configuration of the molecule of the compound is, of course, not removable without changing the compound itself. It has been shown that a synthetic compound similar to ethyl hydnocarpate, pure dinormal heptyl ethyl acetate,[3] is even more irritating than ethyl hydnocarpate, while the glyceryl ester of this synthetic compound (corresponding to a natural oil) is bland. This would indicate that part of the irritant effect of the ethyl esters is associated with the ethyl radicle.

A method of preparing hydnocarpus ethyl esters of a standard low-irritant quality, no matter how irritating the original oil may be, has already been described.[4] Since the publication of this process, however, continued experimentation has thrown further light upon the causes of irritation and their prevention.

RELATION BETWEEN IRRITATION AND TYPE AND SHAPE OF CONTAINER

Our standard method [5] for iodizing ethyl esters is as follows:

Fifteen liters of the purified esters are heated in a 20-liter enameled or stainless steel kettle to 140° C. The esters must be thoroughly dried before iodine is added since, if water is present, it effects by catalysis the hydrolysis of several per cent of the esters. If the filtered esters are clear, the heating to 140° C. before adding the iodine will drive off all dissolved water. Seventy-five grams of chemically pure resublimed iodine are added with stirring. The temperature immediately rises to 150° C., at which point it is maintained for exactly thirty minutes, the liquid being stirred occasionally. After cooling, the iodized esters are filtered into bottles (250 cubic centimeters capacity) and sterilized for one hour

[3] Private communication from C. B. Lara; drug prepared by Roger Adams.
[4] Cole, Philip. Journ. Sci. 40 (1929) 503.
[5] Loc. cit.

in an oven at 150° C. The temperature of the contents of the bottles reaches in this time 110° C.

Since this method of iodization was adopted, more than 3,000 liters of ethyl esters (200 lots of 15 liters each) have been iodized and used with practically no complaints of excessive irritation. Smaller institutions, however, might desire to make smaller lots of esters. It was found, in certain recent experimental work, that when the drug was iodized in 2-liter lots instead of the standard 15-liter batches, it was more irritating than usual, although the standard method was carefully followed, except for the fact that these lots were heated in tall, 3-liter glass beakers instead of low, stainless steel or enameled kettles. Experiments were then made using enameled beakers instead of glass beakers, but the drug so prepared was no less irritating. The form of the container was changed from a tall (beaker) type to a shallow (pan) type.[6] The preparations were equally irritating provided that the time of heating to 150° C. and time of cooling to room temperature of these two types were the same. In ordinary practice, however, with the low form (pan type), the drug heats more quickly and cools more rapidly than with the tall form. The longer time necessary to heat and cool the contents of the tall type of container corresponds to overheating of the drug, and we already know that overheating results in an irritant product. This rapid heating and cooling is evidently preferable, for the product in this case was less irritant and, in fact, entirely comparable with that produced by the standard method for 15-liter lots.

EFFECT OF STIRRING ON IODIZATION

In order to determine whether stirring during the iodization is beneficial or otherwise, two batches of esters were iodized at the same time under identical conditions, except that one lot was gently stirred only during the addition of the iodine, while the other one was vigorously stirred by means of a motor stirrer during the entire heating. The time of heating to 140° C. (15 minutes), the time of heating with iodine at 150° C. (30 minutes), and the time necessary to cool to 40° C. (2 hours) were kept constant for both lots by regulating the heat input. No

[6] It is assumed that the container will be more than half filled. The depth of the liquid would then be greater than the diameter in the tall type and should be not much more than half the diameter in the shallow type.

differences in color or irritant properties were observed. Occasional stirring, however, is considered necessary to distribute the heat evenly and to hasten the solution of the iodine. Vigorous stirring is unnecessary.

RELATION BETWEEN IRRITATION AND COLOR

The color of iodized esters varies from a turbid greenish to a clear reddish brown, depending on the temperature and time of heating the iodine with the esters. Low temperatures and short time of heating yield a greenish product. High temperatures and prolonged heating yield a clear reddish-brown product.

Color determinations on over a hundred samples were made in order to determine whether there might not be a definite relationship between color and irritant properties. Direct color measurements were not possible owing to the depth of color; diluted samples were, therefore, compared. One cubic centimeter of sample was diluted with 25 cubic centimeters of 95 per cent alcohol. A 15-liter lot of iodized esters was taken as standard and all other lots were compared with this one. Comparisons were made in a Bausch and Lomb colorimeter using 20 millimeters depth for the standard. Table 1 shows typical lots of esters compared in this manner. It is obvious that no definite relationship can be drawn between irritant properties and tint and shade of color. On the other hand, these experiments proved that clear reddish-brown at the overheated end and turbid greenish iodized esters at the underheated end of the range are irritating. The correct range of color and turbidity lies between these extremes, but there can be a considerable variation without noticeable change in irritant properties.

RELATION BETWEEN IRRITATION AND EXPOSURE TO SUNLIGHT, AIR, AND HEAT

Iodized esters were exposed to bright sunlight for fourteen hours in (1) filled, well-stoppered bottles and (2) open beakers. Controls were kept in the dark. The irradiated contents of the stoppered bottles and both the stoppered-bottle and open-beaker controls showed no change, but the preparation exposed to sunlight in the open beakers exhibited a marked change in color. The color became more reddish and paler and the turbidity disappeared.

All lots were then kept in the dark for sixteen days at room temperature (30° C.). Very little change was observed in any

except the open beakers previously exposed to sunlight; in these the color had continued to fade until it was only one-fourth as deep as the control. This indicates that sunlight in the presence of air acts as an accelerator of this reaction, the catalytic effect persisting in the drug even after its removal to the dark. Products affected in this way proved extremely irritating.

In order to determine whether this reaction is accelerated by light or heat rays or both, iodized esters in filled, sealed bottles and in open beakers were heated in the dark for ten days at 50 °C. as this was the maximum temperature reached by the drugs in the direct sunlight. At the end of fourteen hours, a slight change of color was observed in the open beakers only. This change increased to a marked degree at the end of ten days, showing that heat in the presence of air can accelerate the same reaction as sunlight and air but, as might be supposed, not nearly so rapidly. The controls show that at 30° C. the change is negligible. Table 2 summarizes the results of these experiments.

TABLE 1.—*Relation of color to irritation in iodized ethyl esters.*[a]

Lot number.	Color in millimeters compared with standard.	Tint.	Number of patients tested.	Irritation.		
				Greater than standard per cent.	Less than standard per cent.	Equal to standard per cent.
38 B (Standard)	20	Green brown	331			
V	12	do	98	5.1	30.6	64.3
W	17	Turbid green brown	82	7.3	18.3	74.4
X	22	Green brown	73	5.5	32.9	61.6
Z	23	do	78	5.1	23.1	71.8

[a] The irritation experiments were performed by the members of the medical staff of the Culion Leper Colony. The standard drug and the samples to be tested were injected usually in the upper arm of the patient. Sufficient esters to produce a wheal one centimeter in diameter was injected by the intradermal method. Comparisons were made of the pain upon injection and degree of tissue reaction. Observations were made also after 24, 48, 72 hours and one week.

SUMMARY

The causes of irritation upon injection of iodized ethyl esters of hydnocarpus-group oils are discussed.

The shape of the container in which iodization is accomplished is important. A low (pan) type of vessel rather than a high (beaker) type should be used.

TABLE 2.—*Effect of light, heat, and air on color and irritation of iodized ethyl esters.*

	Color in millimeters equivalent to 20 millimeters of standard.	
	Filled stoppered bottles.	Open beakers.
Before exposure	22	22
Exposed to direct sunlight, 10 hours	22	*35
Exposed to direct sunlight, 14 hours	22	*41
Exposed to direct sunlight, 14 hours plus 16 days in dark	22	*60
Exposed in dark, 10 days at 30° C	22	24
Exposed in dark, 14 hours at 50° C	22	28
Exposed in dark, 10 days at 50° C	22	*60

* Products marked thus were found to be very irritating upon injection.

Occasional stirring during iodization of the esters is probably beneficial. Continuous vigorous stirring is not necessary.

Experiments show that color comparison cannot be utilized as control in the production of standard relatively nonirritating iodized ethyl esters; time and temperature of heating of the esters with the iodine must be used as the basis of control.

Sunlight or heat in the presence of air soon changes the iodized esters in such a way as to yield an extremely irritating product. This deterioration is accompanied by increased clarity and change in color to reddish brown.

The author wishes to gratefully acknowledge his indebtedness to Dr. C. B. Lara and the medical staff at Culion for performing the irritation tests mentioned in this article.

DIE BRENTHIDEN DER PHILIPPINEN-INSELN

Von R. Kleine

Stettin, Deutschland

SECHSZEHN KARTEN

Der Catalogus Coleopterorum Junk-Schenklings, ed. 1, enthält nur 8 Arten von den Philippinen, davon sind 2 synonym so dass tatsächlich nur 6 Arten bekannt waren. Heute beträgt der Bestand 124 Arten.

In letzten Jahrzehnt sind umfangreiche Ausbeuten von den Inseln gekommen. Namentlich hat der leider viel zu früh verstorbene Charles Fuller Baker ein gewaltiges Material an Individuen zusammengebracht, das zum kleineren Teil von Prof. Heller, Dresden, später auf Hellers Empfehlung mir zur Bearbeitung überlassen worden ist. Im Zeitraum von mehreren Jahren habe ich zahlreiche Sendunge Bakers bearbeitet und einen guten Einblick in die Brenthidenfauna der Philippinen tun können. Dazu kommt noch ein Teil des Materials, das Boettcher, der, wie bekannt, für Moser gesammelt hat, mitgebracht hatte. Ferner sei noch auf das in der Sammlung des Bureau of Science zu Manila hingewiesen. Soviel darf ich wohl heute ohne Uebertreibung sagen: der wesentlichste Bestand der philippinischen Brenthiden-Arten ist heute bekannt. Was noch unbearbeitet in Museen liegt—es kann sich nur um das, früher in Mosers Besitz befindliche Material handeln—kann nicht mehr aufregen. Was wir von der Brenthidenfauna der philippinischen Inselwelt wissen wollen, wissen wir.

Die Arbeit soll einen rein zoogeographischen Charakter tragen.

Gelegentlich der Bearbeitung der philippinischen Lyciden[1] habe ich in der Einleitung zur Zoogeographie folgendes gesagt:

> Nach meinen Erfahrungen, die ich in jahrelanger Bearbeitung bei den Brenthiden gemacht habe, sind die Philippinen unbedingt zum austro-malayischen Gebiet zu rechnen. Der papuanische Einschlag, der sich namentlich in der Ausfärbung zeigt ist so bedeutend, dass man die Philippinen

[1] Philip. Journ. Sci. 31 (1926) 34.

als einen abgesprengten Teil Neu-Guineas ansehen könnte. Die Beziehungen zu den Molukken waren sehr gering, dagegen erwies sich als sicher, dass eine Zuwanderung aus dem orientalischen Gebiet stattgefunden hatte. Bei den Einwanderern handelte es sich um grosse, weitverbreitete Gattungen, die zum Teil auf den Philippinen mit ihrer Wanderung zu Ende gekommen waren und keinen Anschluss auf der südöstlichen Zugstrasse über Celebes gefunden hatten. Zum Teil sind es Arten, die im indo-malayischen Untergebiet weitverbreitet sind, also eine grosse Migrationsfähigkeit und -geschwindigkeit besitzen. Viele der Zuwanderer wurden auf Palawan festgestellt. Dass die Zuwanderung unbedingt über diese Inseln stattgefunden haben muss ist damit nicht gesagt, ich glaube vielmehr, dass der Zustrom im Zuge der Sulu-Inseln wenigstens ebensogross, wenn nicht noch grösser, gewesen ist. Leider sind diese zoogeographisch so wichtigen Inseln noch nicht exploriert.

Diese Ansicht halte ich auch heute noch aufrecht und schränke sie nur insoweit ein, als der Zustrom aus dem orientalischen Gebiet beiden Brenthiden grösser ist, als aus dem austro-malayishchen, eben, weil die Abtrennung von dem sich um Neu Guinea gruppierenden Landmassiv eine vollkommenere ist, als von den Sunda-Inseln. Wie in meiner Arbeit über die Lyciden, habe ich Palawan auch hier nicht zu den Philippinen gerechnet. Sie gehören organisch und faunistisch zu Borneo.

DIE VERBREITUNG AUF DEN EINZELNEN INSELN

Von Marinduque, Catanduanes, Burias, Tablas, Cebu, Ticao, Biliran und Dinagat lag mir kein Material vor. Die Werbreitung auf den einzelnen Inseln war folgende: Von den 124 Arten waren 6 ohne nähere Fundortangabe, 188 mit sicheren Fundorten belegten Arten fanden sich auf:

Luzon	58	Siargao	7
Polillo	4	Panay	3
Mindoro	2	Negros	26
Masbate	1	Mindanao	66
Samar	20	Basilan	15
Sibuyan	7	San Miguel	5
Leyte	9	Panaon	2
Bohol	1		

Die Gattungen sind, soweit sie mehrere Arten umfassen, auf den ganzen Archipel verbreitet. Die einzelnen Arten sind, wenigstens nach unseren bisherigen Kenntnissen, zum teil lokal. Bei häufigeren Arten kann man aber leicht feststellen, dass die einzelnen Inseln wahrscheinlich keine Endemismen beherrbergen, dass die Arten vielmehr auf allen Inseln zu finden sein werden. In nachstehender Tabelle ist die Verbreitung der einzelnen Arten angegeben.

	Prozent		Prozent
Endemisch	47.6	Java	28.2
Ceylon	8.1	Andamanen	9.0
Indien	16.2	Formosa	10.5
Bengalen	20.0	Japan	1.6
Indo-China	9.0	Celebes	9.0
Malay Halbinsel	31.4	Molukken	15.3
Sumatra	34.7	Neu-Guinea	7.4
Borneo	36.3	Australien	5.7

Danach zählen zum Indischen Untergebiet 53.3 prozent, zum Gebiet das sich um die grossen Sunda-Inseln und Malakka gruppiert 139.6 prozent, zum Palaearktikum 11.6 prozent und zum austro-malayischen und australischen Gebiet 37.4 prozent.

Vergleicht man die Zahlen in Bezug auf die mutmassliche Zuwanderung, so ist das Verhältnis wie 204.5 : 37.4 oder wie 5.5 : 1.

Am übersichtlichsten sind die Zahlen, wenn sie relativ angewandt werden, wie das vorstehend geschehen ist. Da fällt zunächst die hohe Zahl der Endemismen auf. Nicht weniger als 47.6 prozent kommen nur auf den Philippinen vor. Das ist fast die Hälfte aller Arten. Es muss angenommen werden, dass sich diese Zahl nicht wesentlich verändert, denn die Brenthidenfauna der orientalischen Region ist so weit bekannt, dass sich nicht viel mehr, wenigstens was die Zusammensetzung und Verteilung anlangt, verändern wird.

Wie steht es nun mit dem Vergleich zu anderen Faunengebieten? Ich will von einem Vergleich mit der aethiopischen, madegassischen und neotropischen Region absehen, da darüber bei Betrachtung der Tribus gesprochen wird. Es sollen hier nur Gebiete in Frage kommen, in denen philippinische Arten angetroffen worden sind. Ich fasse diese Gebiete in drei Gruppen zusammen: 1. Die eigentliche indische, westliche. Hierzu sind zu zählen: Ceylon, Indien, die um die Bucht von Bengalen liegenden Gebietsteile und Indo-China. Summiert man die relativen Zahlen so ergeben sich 53.3. Der indischen Gruppe möchte ich: 2. Ein zentrales Gebiet entgegenstellen, das die malayische Halbinsel, die Sunda-Inseln und die kleinen Inseln, die daran liegen, einbegreift. Die Addition der relativen Zahlenwerte gibt hier die Summe von 139.6. Als drittes kleines Gebiet soll Formosa und Japan gelten, die Gesamtsumme beträgt 11.6. Die östlich und südöstlich des zentralen Gebietes liegenden Molukken einschliesslich Celebes 24.3 und endlich Neu-Guinea mit Australien und den polynesischen Inseln 13.1.

TABELLE 1.—*Tabelle der Verbreitung der philippinischen Brenthiden-Arten.*

Arten.	Luzon.	Polillo.	Mindoro.	Masbate.	Samar.	Sibuyan.	Leyte.	Bohol.	Panay.	Mindanao.	Basilan.	San Miguel.	Negros.	Siargao.
Calodromus crinitus Kleine	+	—	—	—	—	—	—	—	—	—	—	—	—	—
Calodromus mellyi Guérin	+	—	—	—	—	—	—	—	—	—	—	—	—	—
Cyphagogus buccatus Kleine	—	—	—	—	+	—	—	—	—	+	—	—	—	—
Cyphagogus eichhorni Kirschbaum	—	—	—	—	—	+	—	—	+	+	—	—	+	—
Cyphagogus gladiator Kleine[a]	—	—	—	—	—	—	—	—	—	+	—	—	—	—
Cyphagogus humilis Kleine	—	—	—	—	—	—	—	—	—	+	—	—	—	—
Cyphagogus longulus Senna	—	—	—	—	—	—	—	—	—	+	—	—	—	—
Cyphagogus modiglianii Senna [a]	—	—	—	—	—	—	—	—	—	+	—	—	—	—
Cyphagogus planifrons Kleine	—	—	—	—	+	—	—	—	—	+	—	—	—	—
Cyphagogus silvanus Senna	—	—	—	—	—	—	—	—	—	+	—	—	—	—
Cyphagogus simulator Senna	—	—	—	—	—	—	—	—	—	+	—	—	—	—
Cyphagogus tabacicola Senna	+	—	—	—	—	—	—	—	—	+	—	—	—	—
Cyphagogus westwoodi Parry	—	—	—	—	—	—	—	—	—	—	—	—	+	—
Cyphagogus whitei Westwood [a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Epigogus flexibilis Kleine	—	—	—	—	—	—	—	—	—	+	+	—	+	—
Orthopareia idonea Kleine	+	—	—	—	—	—	—	—	—	—	—	—	—	—
Asaphepterum formosanum Kleine	+	—	—	—	—	—	—	—	—	—	—	—	—	—
Opisthenoxys boettcheri Kleine	—	—	—	—	—	—	—	—	—	+	—	—	—	—
Opisthenoxys ochraceus Kleine	—	—	—	—	—	—	—	—	—	+	+	—	+	—
Pseudocyphagogus squamifer Desbr.	—	—	—	—	+	—	—	—	—	—	—	—	+	—
Mesoderes fessus Kleine	—	—	—	—	—	—	—	—	—	—	—	—	+	—
Atopomorphus schultzei Kleine	—	—	—	—	—	—	—	—	—	—	—	—	+	—
Eterozemus laetus Senna	+	—	—	—	—	—	—	—	—	—	—	—	—	—
Eterozemus pubens Senna	+	—	—	—	—	—	—	—	—	—	—	—	—	—
Dictyotopterus philippinensis Kleine[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dictyotopterus pulcherrimus Kleine	+	—	—	—	—	—	—	—	—	—	—	—	—	—

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TABELLE 1.—*Tabelle der Verbreitung der philippinischen Brenthiden Arten*—Continued.

Arten.	Luzon.	Polillo.	Mindoro.	Masbate.	Samar.	Sibuyan.	Leyte.	Bohol.	Panay.	Mindanao.	Basilan.	San Miguel.	Negros.	Siargao.
Miolispa perseresimilis Kleine	|	|	|	|	|	|	|	|	|	+	|	|	|	|
Miolispa pulchella Kleine	+	|	|	|	|	|	|	|	|	|	|	|	|	|
Miolispa robusta Kleine	+	+	+	|	+	|	|	|	|	+	+	|	|	|
Miolispa siporana Senna	|	|	|	|	|	|	|	|	|	+	|	|	|	|
Miolispa unicolor Kleine	+	|	|	|	|	|	|	|	|	+	|	|	|	|
Hypomiolispa ezarata Desbr.	|	|	|	|	+	|	|	|	|	+	+	|	|	|
Hypomiolispa helleri Kleine	|	|	|	|	|	|	|	|	|	+	|	|	|	|
Hypomiolispa nupta Senna	+	|	|	|	|	|	|	|	|	+	|	|	|	|
Hypomiolispa ocularis Kleine	+	|	|	|	+	|	|	|	|	+	|	|	|	|
Hypomiolispa sponsa Kleine	|	|	|	|	|	|	|	|	|	+	|	|	|	|
Hypomiolispa tomentosa Kleine	|	|	|	|	+	|	|	|	|	+	|	|	|	|
Hypomiolispa trachelizoides Senna	|	|	|	|	+	|	|	|	|	+	|	|	|	|
Higonius cilo Lewis	+	|	|	+	|	|	|	|	|	|	|	|	|	|
Microtrachelizus fluxus Kleine	|	|	|	|	|	|	|	|	|	|	|	|	+	|
Microtrachelizus pubescens Senna	|	|	|	|	+	|	|	|	|	|	|	|	+	|
Microtrachelizus siamensis Kleine	|	|	|	|	|	|	|	|	|	|	|	|	|	|
Microtrachelizus tabaci Senna	|	|	|	|	|	|	|	|	|	|	|	|	|	|
Hoplopisthius trichimerus Senna	+	|	|	|	|	|	|	|	|	|	|	|	|	|
Cordus peguanus Senna	|	|	|	|	|	|	|	|	|	+	+	|	+	|
Leptamorphocephalus federatus Kleine	|	|	|	|	+	|	|	|	|	|	|	|	+	|
Paramorphocephalus setosus Kleine	|	|	|	|	|	|	|	|	|	|	|	|	|	|
Agriorrhynchus ignarius Kleine	+	|	|	|	|	|	|	|	|	+	|	|	|	|
Eupeithes dominator Kleine	|	|	|	|	|	|	|	|	|	|	|	|	|	|
Prophthalmus longirostris Gyllenhal	+	|	|	|	|	|	|	|	|	+	|	|	+	|
Prophthalmus tricolor Power	+	|	|	|	+	|	|	|	|	+	|	|	+	|
Bargrrhynchus schroederi Kleine	+	|	|	|	+	|	|	|	|	+	|	|	+	|

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TABELLE 1.—*Tabelle der Verbreitung der philippinischen Brenthiden-Arten*—Continued.

Arten.	Luzon.	Polillo.	Mindoro.	Masbate.	Samar.	Sibuyan.	Leyte.	Bohol.	Panay.	Mindanao.	Basilan.	San Miguel.	Negros.	Siargao.
Schizotrachelus brevicaudatus Lacordaire	+	—	—	—	—	+	—	—	—	—	—	—	+	—
Schizotrachelus brunneus Kleine	+	—	—	—	—	—	—	—	—	—	—	—	—	—
Schizotrachelus consimilis Kleine	+	—	—	—	—	—	—	—	—	—	—	—	—	—
Schizotrachelus corpulentus Kleine	—	—	—	—	—	—	—	—	—	+	—	—	—	—
Schizotrachelus imbricellus Kleine	+	—	—	—	—	—	+	—	+	—	—	+	—	—
Schizotrachelus imitator Kleine	+	—	—	—	—	—	—	—	—	—	—	—	—	—
Schizotrachelus inconstans Kleine	+	—	—	—	—	—	—	—	—	—	—	—	—	—

TABELLE 2.—*Die philippinischen Brenthiden im Vergleich mit anderen Gebieten.*

	Endemismen.	Ceylon.	Indien.	Bengalen.	Indo-China.	Malay-Halbinsel.	Sumatra.	Borneo.	Java.	Andamanen.	Formosa.	Japan.	Celebes.	Molukken.	Neu-Guinea.	Australien.	Gesamtzahl der Arten.
Calodromini	10	2	10	11	1	14	13	13	11	3	1	—	—	3	—	1	26
Stereodermini	3	5	5	5	4	5	9	8	7	5	4	—	3	3	3	3	15
Trachelizini	19	1	2	6	1	11	9	13	9	—	5	2	3	4	2	1	36
Amorphocephalini	2	—	—	1	—	1	1	—	—	—	—	—	—	—	—	—	3
Arrhenodini	6	—	—	—	2	3	2	2	2	—	1	—	4	2	1	—	10
Belopherini	7	—	—	—	—	—	—	1	—	—	—	—	1	—	—	—	9
Ithystenini	4	—	—	—	—	—	3	4	2	—	—	—	—	3	1	—	8
Pseudoceocephalini	8	2	3	2	3	5	6	4	5	3	2	—	—	4	2	2	17
Total																	124

Ich habe in meinen zoogeographischen Studien mehrfach darauf hingewiesen, dass ich zwei Ausgangszentren annehme: das zentrale Afrika, aus welchem eine Wanderung nach Osten und Westen stattgefunden hat und ein grösseres, zusammenhängendes Landmassiv, dessen Reste in Neu-Guinea, Australien und dem gewaltigen Inselreich, das sich von Celebes bis Tahiti hinzieht hinzuzurechnen ist. Von hier aus hat eine zirkumpolare Ausbreitung stattgefunden. Auch nach Nordwesten sind die hier hergehörigen Formen gewandert, ohne indessen den aus Osten kommenden Zug der Familiengenossen Einhalt zu tun. Der aus Westen kommende Wanderzug hat sich als der stärkere erwiesen. Von den 124 auf den Philippinen gefundenen Arten gehören 107 dem westlichen (afrikanischen) Formenkreis an und 17 dem östlichen (austro-malayischen, bezw., australischen). Die Brenthiden-Fauna der Philippinen muss also als orientalisch angesehen werden.

Es wäre noch die Frage zu erörtern, ob sich auf den einzelnen Inseln ein besonderer Typ in der Ausfärbung ausgebildet hat. Es gibt Gebiete, zum Teil noch kleiner als die Philippinen, die einen bestimmten Farbentyp erkennen lassen und wo es leicht ist, die Zugehörigkeit der Art zum Gebiet festzustellen. Das kann man hier nicht sagen. Was die allgemeine Ausfärbung anlangt, so ist eine Tatsache allerdings sehr beachtenswert, nämlich, dass sich auf den Philippinen, und zwar nur dort, Farbenkomponenten zusammengefunden haben die sonst nur in Neu-Guinea und den angrenzenden Inseln zu finden sind: schwarze bis blauschwarze Grundfarbe und ziegelroter Prothorax. Es muss aber gleich darauf hingewiesen werden, dass nicht nur Arten südöstlicher Provenienz davon betroffen sind, sondern auch solche orientalischer Herkunft. Es kann also wohl mit Recht angenommen werden, dass die Inseln noch zum Landmassiv Neu-Guineas gehörte als die Hauptwanderung von Ost nach West und umgekehrt bereits beendet war.

Weiter sind die Deckenzeichnunger auf den Elytren insofern bemerkenswert, als sie die im vorigen Abschnitt geäusserte Ansich über die Zugehörigkeit zum alten Landmassiv Neu-Guineas dadurch unterstätzen, dass sich eine ganz ausgesprochen Längsstreifung bemerkbar macht. Die Orientalen haben eine entgegengesetzte Tendenz. Zu beachten ist die Tatsache, dass Palawan nicht zum Färbungsgebiet, wie überhapt nicht zu den Philippinen gehören, sondern zu Borneo. Eine genaue Durchforschung der Palawan-Inseln wäre von höchstem Interesse, um festzustellen, welche Bedeutung ihnen als Brücke zukommt.

SYSTEMATISCHER KATALOG DER PHILIPPINISCHEN BRENTHIDEN

CALODROMINI

Genus CALODROMUS Guérin

Calodromus GUÉRIN, Mag. Zool. (1832) t. 34.

CALODROMUS CRINITUS Kleine.

Calodromus crinitus KLEINE, Arch. Nat. A. 10 87 (1921) 24, fig. 1.

LUZON, Provinz Laguna, Mount Maquiling. (Belegstück im Museum zu Dresden.) Endemische Art.

CALODROMUS MELLYI Guérin.

Calodromus mellyi GUÉRIN, Mag. Zool. (1832) t. 34 ♂.

LUZON, Ilocos Norte, Bangui: Manila (Banks).

Die Art is häufig und weit verbreitet. In Indien ist *mellyi* häufig und in Bengalen nachgewiesen. Von Burmah bisher noch nicht bekannt, ist sie in Malakka, Sumatra und Borneo nicht selten. Von Java sah ich noch keine Belegstücke. *Calodromus mellyi* soll auch auf Ceylon gefunden sein, ich konnte die Behauptung nicht entkräften, sah aber das Tier noch nicht von dort.

FIG. 1. Verbreitungskarte der Gattung *Calodromus* Guér.

Die Gattung ist orientalisch. Verwandte Formen finden sich in Sumatra in der Gattung *Allaeodromus* Senna und der aethiopischen Gattung *Cormopus* Kolbe. Die Gattungen sind durch die überbildeten Tarsen in eine Verwandtschaft zu bringen. In die austro-malayische Region ist *Calodromus* nicht vorgedrungen. Habituell besteht innerhalb der Gattung grosse Einformigkeit.

Genus CYPHAGOGUS Parry

Cyphagogus PARRY, Trans. Ent. Soc. London 5 (1849) 182.

CYPHAGOGUS BUCCATUS Kleine.

Cyphagogus buccatus KLEINE, Ent. Mitt. 1–4 (1916) 9, figs. 6, 7.

MINDANAO, Provinz Lanao, Kolambugan (*Boettcher*). SAMAR (*Baker*).

Sicher kommt die Art auch auf anderen Inseln vor, denn sie ist häufig und weit verbreitet. Ausserdem ist sie leicht erkennbar. In dem mir vorgelegenen Material konnte ich sie nachweisen von: Ceylon, Indien, Andamanen, Malakka, Sumatra, Borneo, und Java. Das Verbreitungsgebiet ist geschlossen, da *buccatus* auch von Bengalen nachgewiesen ist.

CYPHAGOGUS EICHHORNI Kirschbaum.

Cyphagogus eichhorni KIRSCHBAUM, Mitt. Zool. Mus. Dresden 1 (1875) 45.

MINDANAO, Provinz Lanao, Kolambugan (*Baker*); Provinz Davao, Davao (*C. M. Weber*). NEGROS, Cuernos Mountains (*Baker*). SIBUYAN (*Baker*). N.-W.-PANAY (*Baker*).

Wie *buccatus* ist auch *eichhorni* verbreitet und leicht erkennbar. Nach Westen wird Burmah nicht überschritten, in Indien fehlt sie. Auf der Malayischen Halbinsel häufig, ist sie von Mentawei und Borneo nachgewiesen. Sehr wahrscheinlich lebt sie auch auf Sumatra, von Java sicher nicht bekannt. *Cyphagogus eichhorni* ist ferner auf die Molukken übergegangen, wie ich selbst feststellen konnte.

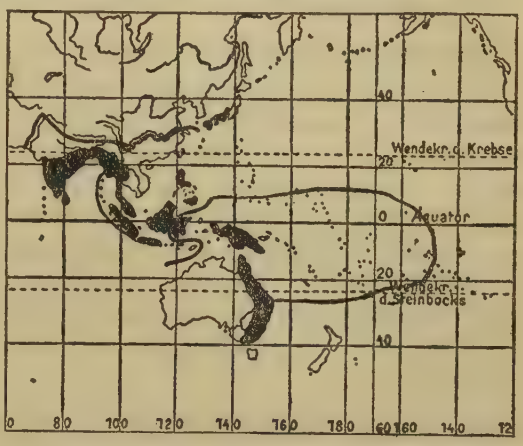


FIG. 2. Verbreitungskarte der Gattung *Cyphagogus* Parry.

CYPHAGOGUS GLADIATOR Kleine.

Cyphagogus gladiator KLEINE, Arch. Nat. A 6 87 (1921) 307, figs. 3, 13.

Ich sah die Art von den Philippinen nicht gerade selten, nähere Fundorte kann ich aber nicht angeben. Die allgemeine Verbreitung ist der der beiden vorhergehenden Arten ähnlich: Assam, Malayische Halbinsel, Mentawei, Sumatra und Borneo.

CYPHAGOGUS HUMILIS Kleine.

Cyphagogus humilis KLEINE, Philip. Journ. Sci. 28 (1925) 590.

MINDANAO, Provinz Lanao, Kolambugan (*Banks*). Endemische Art.

CYPHAGOGUS LONGULUS Senna.

Cyphagogus longulus SENNA, Not. Leyd. Mus. 2 (1898) 52.

MINDANAO, Provinz Agusan, Cabadbaran (*C. M. Weber*).

Verbreitung: Siam, Malayische Halbinsel, Java, Ceram, Batjan. Sehr wahrscheinlich ist die Art auch auf Sumatra und Borneo zu Hause, ich sah aber noch keine Belegstücke von dort.

Der Uebergang von den grossen Sunda-Inseln nach den Philippinen ist ohne Berührung von Sumatra und Borneo nich recht denkbar. Die Verbreitung dürfte der von *buccatus* und *eichhorni* analog sein.

CYPHAGOGUS MODIGLIANII Senna.

Cyphagogus modiglianii SENNA, Ann. Mus. Genova (2) 13 (33) (1893) 258.

Ohne näheren Fundort aus Sammlung Baker.

Eine weit verbreitete, aber zerstreut vorkommende und seltene Art, deren ganzes Verbreitungsgebiet sicher noch nicht bekannt ist. Senna beschrieb die Art von Sumatra, Insel Engaño. Ich sah Stücke von Pahang, der Fundort überrascht nicht. Der Fund von den Philippinen schliesst sich zwanglos an. Etwas ungereimt erscheint dagagen das Vorkommen in Nord-Queensland. Es liegt allerdings kein Ausnahmefall vor. Man kann gleichweite Verbreitung mehrfach feststellen, es handelt sich dann allerdings um häufige Arten mit grosser Migration.

CYPHAGOGUS PLANIFRONS Kirschbaum.

Cyphagogus planifrons KIRSCHBAUM, Mitt. Zool. Mus. Dresden 1 (1875) 46.

MINDANAO, Provinz Lanao, Iligan (*Baker*). SAMAR (*Baker*).

Häufige Art in der weiten Verbreitung von *buccatus* und *eichhorni:* Indien, Assam, Malayische Halbinsel, Borneo, Sumatra, Java. Das Verbreitungsgebiet ist also gut abgeschlossen.

CYPHAGOGUS SILVANUS Senna.

Cyphagogus silvanus SENNA, Boll. Soc. Ent. Ital. 35 (1902) 154.

Bisher lag mir nur einmal ein Stück aus der Boettcher'schen Ausbeute mit unleserlichem Fundort von Mindanao vor. Allgemeine Verbreitung gleich der vorigen Art: Indien nicht selten, Malakka, Sumatra, Mentawei, Borneo, Java, Buru.

CYPHAGOGUS SIMULATOR Senna.

Cyphagogus simulator SENNA, Boll. Soc. Ent. Ital. 34 (1902) 155.

MINDANAO (*Baker*). Näherer Fundort fehlt.

In der Verbreitung sehr wahrscheinlich mit *silvanus* übereinstimmend, wenn auch die Funde sich nicht so lückenlos aneinander reihen: Assam, Malakka, Sumatra, Borneo und Java.

CYPHAGOGUS TABACICOLA Senna.

Cyphagogus tabacicola SENNA, Boll. Soc. Ent. Ital. 25 (1893) 294, T. 2, fig. 1, 1b.

LUZON, Provinz Laguna, Mount Maquiling (*Baker*). MINDANAO, Provinz Lanao, Kolambugan (*Banks*).

Eine häufige und leicht erkennbare Art in derselben weiten Verbreitung wie die vorherigen: Indien, Malakka, grosse Sunda-Inseln, Andamanen.

CYPHAGOGUS WESTWOODI Parry.

Cyphagogus westwoodi PARRY, Trans. Ent. Soc. London 5 (1849) 182.

NEGROS, Cuernos Mountains (*Baker*).

Diese gemeine Art ist auf den Philippinen scheinbar nicht häufig, denn ich sah sie in dem grossen Material, das mir im Laufe der Jahre vorgelegen hat, nur dies eine mal. Die Verbreitung ist noch ausgedehnter als bei bisher besprochenen Arten. Von Ceylon bis zu den Philippinen ist sie lückenlos nachgewiesen und es ist die einzige mir bekannt gewordene *Cyphagogus*-Art, die aus Indo-China gameldet ist und die ich selbst von dort sah. Das Hauptverbreitungsgebiet ist allerdings Indien einschliesslich Bengalen, von wo sie fast mit jeder Bestimmungssendung kommt. Da die Hinterbeine ganz eigenartig gebildet sind, so ist keine Verwechslung mit anderen Arten möglich.

CYPHAGOGUS WHITEI Westwood.

Cyphagogus whitei WESTWOOD, Cab. Or. Ent. (1848) T. 15.

Eine ganz unklare Art, die nur von den Philippinen (?) bekannt sein soll. Ich konnte sie nach dem grossen Material, das ich im Laufe der Jahre gesehen habe, nicht identifizieren.

Von den 41 bekannten Arten kommen 12 auf den Philippinen vor. Sieht man von der unsicheren *whitei* ab, so bleibt nur eine Art, die, wenigstens bisher, auf den Inseln endemisch ist. Jedenfalls wird es aber so sein, dass Endemismen überhaupt nicht vorhanden sind.

Die Gattung *Cyphagogus* hat eine grosse Verbreitung. Von Ceylon bis Samoa lässt sie sich verfolgen. In Indien und auf den Sunda-Inseln hat sie eine ansehnliche Artenzahl entwickelt. In ihrem Grundcharakter ist die Gattung orientalisch, 27 Arten sind dahin zu zählen, 5 kommen in der orientalischen

und und papuanischen Region vor, der Rest ist östlich. Selbst in das Palaearktikum ist die Gattung vorgedrungen, bei Brenthiden ein seltener Fall.

Die *Cyphagogus* der Philippinen sind in ihrer Herkunft leicht zu deuten: sie sind wahrscheinlich alle von Westen her eingedrungen. Das ist umsomehr anzunehmen, als die Gattung grosse Aehnlichkeit mit *Cormopus* hat, diese liegt aber im Zentrum des westlichen Verbreitungskomplexes, in Zentralafrika. Zu Japan, Celebes oder gar Neu-Guinea bestehen keinerlei Beziehunge, von dort aus sind die Philippinen sicher nicht bevölkert worden. Die über Celebes hinausgegangenen sind zum grossen Teil in eine ganz andere Farbenentwicklung gekommen. Nur *modiglianii* bleibt unklar. Es ist indessen zu beachten, dass sich auch in Indien und auf den Sunda-Inseln, vernehmlich an den Rändern des Verbreitungskomplexes, bunte Arten finden. Diese sind aber nicht ohne weiteres mit den Australiern und Papuanern zu vergleichen, zeigen jedoch, dass die Tendenz, an den Randgebieten bunte Arten auszubilden, auffallend gross ist. So erklären sich auch die vielen bunten Arten in Australien und dem östlichen Archipel. Zu den weiten Wanderern aus dem Westen gehört auch *modiglianii;* er ist, wie die anderen *Cyphagogus* der Philippinen auch, mit dem grossen Strom gewandert und, wie es scheint, ein seltener Gast auf verlorenen Posten geblieben.

Genus EPIGOGUS Kleine

Epigogus KLEINE, Ent. Blätt. 19 (1923) 159.

EPIGOGUS FLEXIBILIS Kleine.

Epigogus flexibilis KLEINE, Ent. BLÄTT. 19 (1923) 159, fig. 1.

MINDANAO, Provinz Lanao, Kolambugan (*Boettcher*). NEGROS, Cuernos Mountains (*Baker, Schultze*). BASILAN (*Baker*). Endemische Art.

Genus ORTHOPAREIA Kleine

Orthopareia KLEINE, Philip. Journ. Sci. 28 (1925) 591.

ORTHOPAREIA IDONEA Kleine.

Orthopareia idonea KLEINE, Philip. Journ. Sci. 28 (1925) 592.

LUZON (*Weber*). Ohne nähere Fundortangabe. Endemische Art.

Beide Gattungen umfassen nur je eine Art, es sind also, wenigstens bis jetzt, auch die Gattungen endemisch.

Genus ASAPHEPTERUM Kleine

Asaphepterum KLEINE, Ent. Mitt. 1–4, 5 (1916) 85.

ASAPHEPTERUM FORMOSANUM Kleine.

Asaphepterum formosanum KLEINE, Ent. Mitt. 1–4, 5 (1916) 87, T. 1, figs. 13, 35–37.

LUZON, Provinz Laguna, Mount Banahao (*Boettcher*).

Diese eigenartige Gattung, die nur diese eine Art umfasst, fand ich zuerst zahlreich in Formosa–Ausbeuten. Sie ist aber weiter verbreitet. So sah ich Belegstücke von Borneo und Java, mit Ausnahme von Formosa aber immer nur einzeln.

Genus OPISTHENOXYS Kleine

Opisthenoxys KLEINE, Arch. Nat. A. 10, 87 (1921) 26.

OPISTHENOXYS BOETTCHERI Kleine.

Opisthenoxys boettcheri KLEINE, Philip. Journ. Sci. 28 (1925) 593.

MINDANAO, Provinz Zamboanga, Port Banga (*Boettcher*). Endemische Art.

OPISTHENOXYS OCHRACEUS Kleine.

Opisthenoxys ochraceus KLEINE, Arch. Nat. A. 10, 87 (1921) 28.

MINDANAO, Provinz Zamboanga, Zamboanga, Port Banga (*Boettcher*): Provinz Surigao, Surigao (*Boettcher*). NEGROS, Cuernos Mountains (*Baker*), Fabrica (*Schultze*). BASILAN (*Baker*).

FIG. 3. Verbreitunskarte der Gattung *Opisthenoxys* Kleine.

Die Art ist häufig und recht weit verbreitet: Malayische Halbinsel, Sumatra, Borneo, Java. Die Verbreitung bewegt sich also auf derselben Linie wie die der meisten *Cyphagogus*.

Die Gattung umfasst 4 Arten; die hier nicht genannten kommen nur in Indien vor.

Genus PSEUDOCYPHAGOGUS Desbr.

Pseudocyphagogus DESBR., Journ. Asiat. Soc. Beng. 2, 59 (1890) 221.

PSEUDOCYPHAGOGUS SQUAMIFER Desbr.

Pseudocyphagogus squamifer DESBR., Journ. Asiat. Soc. Beng. 2, 59 (1890) 222.

NEGROS, Cuernos Mountains (*Baker*). SAMAR (*Baker*).

Diese einzige Art der Gattung ist von den Andamanen beschrieben worden und kommt dasalbst auch sehr häufig vor. Die

Verbreitung ist aber sehr viel grösser und bewegt sich auf der Linie der meisten orientalischen Zuwanderer. Mir lag Material vor von: Assam, Malakka, Sumatra, Borneo.

Genus MESODERES Senna

Mesoderes SENNA, Not. Leyd. Mus. 20 (1898) 65.

MESODERES FESSUS Kleine.

Mesoderes fessus KLEINE, Ent. Blätt. 19 (1923) 160.

NEGROS, Cuernos Mountains (*Baker.*) Endemische Art.

Von den 8 bekannten Arten leben in Indien 2, Malakka 2, Buru 1, zwei kommen von Malakka bis Neu-Guinea vor.

FIG. 4. Verbreitungskarte der Gattung *Mesoderes* Senna.

Ohne Zweifel ist die Gattung in ihrem Grundcharakter orientalisch. Der Zug gegen Osten ist gut zu verfolgen. Die beiden nicht endemischen Arten mit grosser Migration lassen deutlich erkennen, dass kein sprunghaftes Vordringen stattgefunden hat, denn beide sind auf allen grossen Sunda-Inseln nachzuweisen. Vielleicht finden sich auch auf den Molukken noch einige Arten an.

Genus ATOPOMORPHUS Kleine

Atopomorphus KLEINE, Philip. Journ. Sci. 28 (1925) 593.

ATOPOMORPHUS SCHULTZEI Kleine.

Atopomorphus schultzei KLEINE, Philip. Journ. Sci. 28 (1925) 594, t. 1, figs. 1–3.

NEGROS, Fabrica (*Schultze*).

Nur diese eine, auf den Philippinen endemische, Art ist bekannt.

Genus ETEROZEMUS Senna

Eterozemus SENNA, Boll. Soc. Ent. Ital. 34 (1902) 160.

ETEROZEMUS LAETUS Senna.

Eterozemus laetus SENNA, Ann. Mus. Genova (2) 12 (32) (1892) 441.

LUZON, Provinz Nueva Vizcaya, Imugan (*Baker*).

Weitere sichere Fundorte sind bekannt von Burmah, Sumatra, Java. Sicher sind die dazwischen liegenden Gebiete auch bewohnt, mir lagen aber von der, nicht gerade häufigen, Art keine Belegstücke vor.

ETEROZEMUS PUBENS Senna.

Eterozemus pubens SENNA, Ann. Mus. Genova (2) 12 (32) (1892) 439.

LUZON, Provinz Laguna, Mount Maquiling (*Baker*).

Mir lagen Stücke vor von: Burmah, Perak, Formosa, Java. Die Verbreitung beider Arten wird wahrscheinlich sehr gleichmässig sein. Ueber das Verbreitungszentrum der Gattung lässt sich nichts sicheres sagen, da beide Arten immer nur einzeln gefunden werden. Nur diese beiden Arten sind bekannt.

Genus DICTYOTOPTERUS Kleine

Dictyotopterus KLEINE, Ent. Mitt. 1–4, 5 (1916) 75.

DICTYOTOPTERUS PHILIPPINENSIS Kleine.

Dictyotopterus philippinensis KLEINE, Arch. Nat. A. 10, 87 (1921) 25.

Philippinen ohne nähere Fundortangabe.

DICTYOTOPTERUS PULCHERRIMUS Kleine.

Dictyotopterus pulcherrimus KLEINE, Arch. Nat. A. 10, 87 (1921) 26.

LUZON, Provinz Laguna, Mount Maquiling (*Baker*). Ausserdem sah ich mehere Belegstücke ohne näheren Fundort.

Es sind drei Arten bekannt. Ausser den beiden genannten lebt eine Art auf Formosa und den Andamanen. *Dictyotopterus* entfernt sich also von der grossen Strasse, auf der wir schon die meisten Zuwanderer kommen sahen, nicht.

Alle auf den Philippinen gefundenen Calodromini sind rein orientalischen Charakters und müssen als Zuwanderer angesehen werden. Zwar sind einige, artenarme, Gattungen nur auf den Philippinen als endemisch festgesteket, aber das will wenig besagen, da die Abstammung von Orientalen sicher ist.

STEREODERMINI

Genus JONTHOCERUS Lacordaire

Jonthocerus LACORDAIRE, Gen. Col. 7 (1866) 415.

JONTHOCERUS ASIATICUS Kleine.

Jonthocerus asiaticus KLEINE, Arch. Nat. A. 8, 85 (1919) 47, figs. 12, 13.

LUZON (ohne nähere Angabe). MINDANAO, Provinz Davao Davao: Provinz Agusan, Butuan (*Baker*). PALAWAN, Puerto Princesa (Sammler unbekannt).

Die Art fand ich ferner aus Material von: Formosa, Sumatra, Borneo. Ich sah einen *Jonthocerus* aus Ceylon, der vielleicht

TABELLE 3.—*Verbreitungstabelle der Calodromini.*

	Ceylon.	Indien.	Bengalen.	Indo-China.	Formosa.	Malay-Halbinsel.	Sumatra.	Borneo.	Java.	Andamanen.	Molukken.	Australien.
Calodromus crinitus Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—
Calodromus mellyi Guérin	—	+	+	—	—	+	+	+	—	—	—	—
Cyphagogus buccatus Kleine	+	+	+	—	—	+	+	+	+	+	—	—
Cyphagogus eichhorni Kirschbaum	—	—	+	—	—	+	+	+	—	—	+	—
Cyphagogus gladiator Kleine	—	—	+	—	—	+	+	+	—	—	—	—
Cyphagogus humilis Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—
Cyphagogus longulus Senna	—	—	—	—	—	+	—	—	+	—	+	—
Cyphagogus modiglianii Senna	—	—	—	—	—	+	+	—	—	—	—	+
Cyphagogus planifrons Kirschbaum	—	+	+	—	—	+	+	+	+	—	—	—
Cyphagogus silvanus Senna	—	+	—	—	—	+	+	+	+	—	+	—
Cyphagogus simulator Senna	—	—	+	—	—	+	+	+	+	—	—	—
Cyphagogus tabacicola Senna	—	+	+	—	—	+	+	+	+	+	—	—
Cyphagogus westwoodi Parry	+	+	+	+	—	+	+	+	+	—	—	—
Cyphagogus whitei Westwood [a]	—	—	—	—	—	—	—	—	—	—	—	—
Epigogus flexibilis Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—
Orthopareia idonea Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—
Asaphepterum formosanum Kleine	—	—	—	—	+	—	—	+	+	—	—	—
Opisthenoxys boettcheri Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—
Opisthenoxys ochraceus Kleine	—	—	—	—	—	+	+	+	+	—	—	—
Pseudocyphagogus squamifer Desbr	—	—	+	—	—	+	+	+	—	+	—	—
Mesoderes fessus Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—
Atopomorphus schultzei Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—
Eterozemus lætus Senna	—	—	+	—	—	—	+	+	+	—	—	—
Eterozemus pubens Senna	—	—	+	—	+	+	—	—	+	—	—	—
Dictyotopterus philippinensis Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—
Dictyotopterus pulcherrimus Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—

[a] Endemisch.

hierher gehören könnte. Ich bezweifle aber die Zugehörigkeit, da nicht einmal von der Malayischen Halbinsel ein Belegstück vorlag. Das übrige Verbreitungsgebiet ist gut abgeschlossen. Der Uebergang von Borneo nach den Philippinen über Palawan ist interessant. Ueber diese Brücke sind sicher sehr viele Arten gewandert.

JONTHOCERUS BICOLOR K. M. Heller.

Jonthocerus bicolor K. M. HELLER, Deutsche Ent. Zeit. (1916) 297.

LUZON, Provinz Laguna, Mount Banahao (*Baker*).

Endemische Art. Die Art ist dadurch wichtig, dass sie die Ausfärbung der Neu-Guinea-Tiere besitzt. Das kommt auf den Philippinen öfter vor, in dieser Gattung ist es aber die einzige Art. Von Neu-Guinea selbst ist kein *Jonthocerus* bekannt.

JONTHOCERUS LATICOSTATIS Kleine.

Jonthocerus laticostatis KLEINE, Arch. Nat. A 8, 85 (1919) 38, figs. 4, 5.

MINDANAO, Lanao, Iligan, Kolambugan (*Baker*).

Ich sah die Art ferner von Formosa, Sumatra, Borneo. Es ist sehr wahrscheinlich, dass sie westlich bis zur Malayischen Halbinsel zu finden ist. Die Verbreitung dürfte sich mit *asiaticus* ziemlich decken.

JONTHOCERUS MODIGLIANII Senna.

Jonthocerus modiglianii SENNA, Ann. Mus. Genova (2) 19 (39) (1898) 228.

MINDANAO, Provinz Agusan, Butuan (*Baker*).

Weitere Verbreitung: Andamanen, Sumatra, Mentawei.

Die Gattung umfasst 18 Arten von denen 14 orientalisch sind. Das Verbreitungszentrum liegt auf den grossen Sunda-Inseln; von hier aus strahlt die Gattung über Formosa bis Japan aus. Aus Indien habe ich nur einen recht schwachen Besatz gesehen, aber, und das ist wichtig, die Verbreitung ist bis Ceylon, wo noch eine endemische Art vorkommt, nicht unterbrochen. Das grosse Areal das die Gattung bewohnt ist daran zu erkennen, dass sowohl in Afrika wie in Australien je zwei Arten leben. Der Gattungstyp ist sehr einheitlich.

FIG. 5. Verbreitungskarte der Gattung *Jonthocerus* Lacord.

Genus STEREODERMUS Lacordaire

Stereodermus LACORDAIRE, Gen. Col. 7 (1866) 419.

STEREODERMUS FLAVOTIBIALIS Kleine.

Stereodermus flavotibialis KLEINE, Arch Nat. A. 10, 87 (1921) 28.

LUZON, Provinz Laguna, Mount Maquiling: Provinz Tayabas, Malinao (*Baker*).

Endemische Art. Die Gattung ist in der Hauptmasse ihrer Arten neotropisch, 18 von 25 leben hauptsächlich in Zentral-Amerika, eine geht bis Südbrasilien, 6 sind von Senna von den

FIG. 6. Verbreitungskarte der Gattung *Stereodermus* Lacord.

Sunda-Inseln beschrieben und ein ist auf den Philippinen endemisch. Die Zugehörigkeit aller Arten zur Gattung erscheint mir hinreichend gesichert. Die Stereodermini sind in allen grossen Gattungen auffällig weit verbreitet (cfr. *Cerobates*).

Genus CEROBATES Schoenherr

Cerobates SCHOENHERR, Gen. Curc. 5 (1840) 487.

CEROBATES ADUSTUS Senna.

Cerobates adustus SENNA, Not. Leyd. Mus. 16 (1894) 184.

MINDANAO, Provinz Lanao, Iligan (*Baker*).

Eine Art von ausserordentlich weiter Verbreitung: Ceylon, Assam, Malayische Halbinsel, Sumatra, Borneo, Java, Nias, Bali, Neu-Guinea, Fiji-Inseln. Die Art steht in der Verbreitung nicht allein da (cfr. *sexsulcatus* und *tristriatus*).

CEROBATES ÆQUALIS Kleine.

Cerobates æqualis KLEINE, Arch. Nat. A. 3, 87 (1922) 203.

LUZON, Provinz Laguna, Mount Banahao (*Boettcher*), Paete (*Boettcher*): Provinz Bataan, Lamao (*Boettcher*). MINDANAO, Provinz Lanao, Mumungan (*Boettcher*): Provinz Zamboanga, Port Banga (*Boettcher*). SAMAR, Catbalogan (*Boettcher*).

Auch diese Art hat eine sehr weite Verbreitung: Ceylon, Indien, Indo-China, Malayische Halbinsel, Sumatra, Borneo, Java, Andamanen, Nicobaren, Ternate. Gegen Osten ist *æqualis* nicht so weit vorgedrungen wie *adustus*.

CEROBATES ANGUSTIPENNIS Senna.

Cerobates angustipennis SENNA, Not. Leyd. Mus. 16 (1894) 182.

LUZON, Provinz Laguna, Mount Banahao (*Boettcher*).

Bisher nur von Java gemeldet. Sehr wahrscheinlich ist die Art aber, wie die meisten, viel weiter verbreitet und nur noch nicht aufgefunden worden.

CEROBATES CLINATUS Kleine.

Cerobates clinatus KLEINE, Treubia 3–4, 3 (1923) 405.

MINDANAO, Provinz Zamboanga, Port Banga (*Boettcher*). Das bei *angustipennis* Gesagte gilt auch hier.

CEROBATES COSTATUS Kleine.

Cerobates costatus KLEINE, Philip. Journ. Sci. 20 (1922) 153, t. 1, fig. 2.

MINDANAO, Provinz Surigao, Surigao (*Baker*). Endemische Art.

CEROBATES FORMOSANUS von Schönfeldt.

Cerobates formosanus VON SCHÖNFELDT, Deutsche Ent. Nat. Bibl. No. 24 2 (1911) 190.

LUZON, Provinz Laguna, Mount Banahao, Los Baños (*Boettcher*): Subprovinz Kalinga, Balbalasan (*Boettcher*). MINDANAO, Provinz Lanao, Mumungan (*Baker*). NEGROS, Cuernos Mountains (*Baker*).

Von Schönfeldt hat die Art aus Formosa-Material beschrieben. Auf den Philippinen ist sie aber wenigstens ebenso stark vertreten wie auf Formosa selbst. Sonst sah ich die Art nicht, sie schein also auf diesen, verhältnismässig kleinen, Verbreitungskreis beschränkt zu sein.

CEROBATES GROUVELLEI Senna.

Cerobates grouvellei SENNA, Boll. Soc. Ent. Ital. 3, 15 (1893) 307, t. 2, fig. 6.

MINDANAO, Provinz Zamboanga, Dapitan (*Baker*).

Die Art ist sehr weit verbreitet, wenn sich auch kein lückenloser Zusammenhang nachweisen lässt. Ich sah Material von: Sumatra, Borneo, Bali, Queensland.

CEROBATES SEXSULCATUS Motschulsky.

Cerobates sexsulcatus MOTSCHULSKY, Et. Ent. 7 (1858) 95.

LUZON, Provinz Laguna, Los Baños, Paete (*Boettcher*). MINDANAO, Provinz Zamboanga, Port Banga (*Boettcher*): Provinz Surigao, Surigao, Dapa (*Boettcher*): Provinz Bukidnon, Tangkulan (*Baker*): Provinz Lanao, Kolambugan (*Baker*): MASBATE, Aroroy, Cabugao (*Boettcher*). BASILAN (*Baker*).

Eine der gemeinsten und weitverbreitetsten Arten, die genau erkennen lässt, wie man sich das Wohngebiet der Gattung, soweit sie nicht aethiopisch ist, zu denken hat. Es lagen mir Belegstücke vor von: Ceylon, Indien, Malayische Halbinsel, Sumatra, Borneo, Java, Sumbawa, Insel Batu, Andamanen, Cochin-China, Celebes, Molukken, Neu-Guinea, Queensland.

CEROBATES SUMATRANUS Senna.

Cerobates sumatranus SENNA, Boll. Soc. Ent. Ital. 3, 25 (1893) 306, t. 3, fig. 1.

LUZON, Provinz Laguna, Mount Banahao (*Boettcher*). MINDANAO, Provinz Zamboanga, Port Banga (*Boettcher*) : Provinz Lanao, Mumungan (*Boettcher*).

Verbreitung der vorigen Art ähnlich: Ceylon, Indien, Malayische Halbinsel, Indo-China, Sumatra, Borneo, Java, Mentawei, Timor, Formosa, Celebes. Da bereits Celebes und die kleinen Sunda-Inseln erreicht sind ist zu erwarten, dass *sumatranus* noch weiter östlich gefunden wird.

CEROBATES TRISTRIATUS Fabricius.

Cerobates tristriatus FABRICIUS, Syst. El. 2 (1801) 554.

LUZON, Provinz Ilocos Norte, Bangui (*Banks*) : Provinz Laguna, Mount Banahao, Mount Maquiling (*Baker*), Magdalena (*Schultze*), Paete (*Boettcher*) : Provinz Nueva Vizcaya, Imugan (*Boettcher*) : Provinz Bataan, Lamao (*Boettcher*), Cabugao (*Boettcher*) ; Malinao (*Baker*). MINDANAO, Provinz Agusan, Cabadbaran (*Weber*) : Provinz Lanao, Mumungan (*Boettcher*) : Provinz Zamboanga, Port Banga (*Boettcher*). SIARGAO, Dapa (*Boettcher*). BASILAN (*Boettcher*). SAMAR (*Baker*).

Verbreitung also gleich *sexsulcatus*.

Von den 37 Arten dieser Gattung gehören 15 der aethiopischen Region an und scheiden ganz aus, 2 sind als australisch anzusehen, 20 sind orientalisch, ganz gleich, wie weit die Verbreitung gegen Osten stattgefunden hat. Der Habitus ist so einheitlich, dass Zweifel über die Zugehörigkeit zur Gattung ausgeschlossen sind. Die Stereodermini sind ganz allgemein durch grosse Migration ausgezeichnet. Wenigstens gilt das für die artenreichen Gattungen.

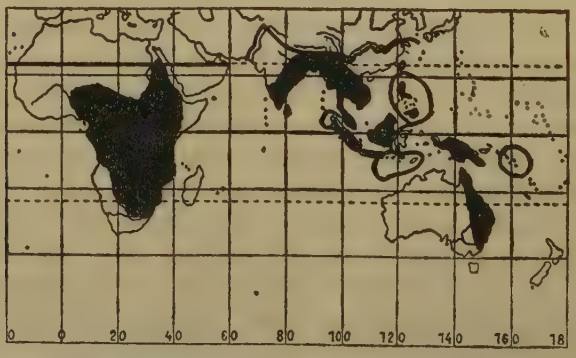


FIG. 7. Verbreitungskarte der Gattung *Cerobates* Schoenherr.

TABELLE 4.—*Verbreitungstabelle der Stereodermini.*

	Ceylon.	Indien.	Bengalen.	Malay-Halbinsel.	Sumatra.	Borneo.	Java.	Indo-China.	Formosa.	Andamanen.	Mentawei.	Celebes.	Molukken.	Neu-Guinea.	Australien.	Polynesien.
Jonthocerus asiaticus Kleine						+			+							
Jonthocerus bicolor Heller [a]																
Jonthocerus laticostatis Kleine																
Jonthocerus modiglianii Senna											+					
Stereodermus flavotibialis Kleine [a]											+					
Cerobates adustus Senna						+	+	+		+	+	+	+	+		+
Cerobates aequalis Kleine						+	+	+		+	+	+	+	+		+
Cerobates angustipennis Senna							+									
Cerobates clinatus Kleine							+									
Cerobates costatus Kleine [a]									+							
Cerobates formosanus von Schönfeldt																
Cerobates grouvellei Senna					+	+	+	+		+	+	+	+	+	+	+
Cerobates sexsulcatus Motschulsky	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Cerobates sumatranus Senna	+	+	+	+	+	+	+	+		+	+	+		+	+	+
Cerobates tristriatus Fabricius	+	+	+	+	+	+	+	+		+	+	+		+	+	+

[a] Endemisch.

TRACHELIZINI

Genus HOMOPHYLUS Kleine

Homophylus KLEINE, Zool. Meded. Leid. 5 (1920) 244.

HOMOPHYLUS MINDANENSIS Kleine.

Homophylus mindanensis KLEINE, Philip. Journ. Sci. 28 (1925) 595.

MINDANAO, Surigao, Surigao (*Boettcher*). Endemische Art. Zwei weitere Arten sind von Java bekannt.

Genus METATRACHELIZUS Kleine

Metatrachelizus KLEINE, Arch. Nat. A. 3, 88 (1922) 207.

METATRACHELIZUS CONSTANS Kleine.

Metatrachelizus constans KLEINE, Capita Zool. 4, 2 (1926) 20, t. 1, fig. 27.

SIARGAO, Dapa (*Boettcher*).

Ausserdem von Mysol bekannt.

FIG. 8. Verbreitungskarte der Gattung *Metatrachelizus* Kln.

Uber das wirkliche Verbreitungsareal der Gattung lässt sich nichts Sicheres sagen. Von den 7 Arten sind 4 auf den Molukken, 2 in Indien und 1 auf Borneo gefunden worden. Der stärkere Artbestand auf den Molukken ist immerhin auffällig und lässt das Verbreitungszentrum nicht erkennen. Es besteht eine weitläufige Verwandtschaft mit den Stereodermini, vielleicht hängt die starke eigung zur Migration damit zusammen.

Genus TRACHELIZUS Schoenherr

Trachelizus SCHOENHERR, Gen. Curc. 5 (1840) 489.

TRACHELIZUS BISULCATUS Fabricius.

Brentus bisulcatus (FABRICIUS), Syst. El. 2 (1801) 548.

LUZON, Provinz Laguna, Mount Maquiling, Malinao (*Baker*); Mount Banahao (*Boettcher*): Provinz Bataan, Lamao (*Boettcher*): Provinz Nueva Vizcaya, Imugan (*Boettcher*). MINDANAO, Provinz Zamboanga, Dapitan (*Baker*): Provinz Lanao, Iligan, Kolambugan (*Baker*); Mumungan (*Boettcher*): Provinz Bukidnon, Tangkulan (*Baker*). LEYTE, Burauen (*Boettcher*). BASILAN (*Boettcher*). SAMAR (*Baker*).

Der gemeinste Brenthide überhaupt. Von Ceylon bis zu den Salomonen, von Japan bis Queensland. Die Gattung umfasst

11 Arten, von denen keine auch nur entfernt so grosse Migration aufweist, im Gegenteil, die meisten haben einen kleinen Verbreitungskreis über den sie nicht hinausgehen. Dabei fällt die Einheitlichkeit im Habitus auf, Stücke von Ceylon sehen genau so aus wie von Australien, den Salomonen oder Japan.

Genus MIOLISPA Pascoe

Miolispa PASCOE, Journ. Ent. 1 (1862) 393.

MIOLISPA BICOLOR Kleine.

Miolispa bicolor KLEINE, Stett. Ent. 80 (1919) 316, fig. 54.

LUZON, Provinz Laguna, Mount Banahao, Mount Maquiling (*Baker*): Provinz Nueva Vizcaya, Imugan (*Weber*). MINDANAO, Provinz Lanao, Mumungan (*Boettcher*): Provinz Surigao, Surigao (*Baker*). MINDORO, Subaan (*Boettcher*). SAMAR (*Baker*). Endemische Art mit Färbung des Neu-Guineatypus.

MIOLISPA CLAVICORNIS Kleine.

Miolispa clavicornis KLEINE, Arch. Nat. A. 10, 87 (1921) 30.

LUZON, Provinz Laguna, Mount Banahao (*Boettcher*): Provinz Nueva Vizcaya, Imugan (*Boettcher*). MINDANAO, Provinz Agusan, Butuan (*Baker*): Provinz Surigao, Surigao (*Boettcher*): Provinz Lanao, Mumungan (*Boettcher*). SIBUYAN (*Baker*). Endemische Art.

MIOLISPA CRUCIATA Senna.

Miolispa cruciata SENNA, Not. Leyd. Mus. 20 (1898) 69.

MINDANAO, Provinz Davao, Davao, (*Baker*): Provinz Agusan, Butuan (*Baker*): Provinz Lanao, Mumungan (*Boettcher*).

Ich sah die Art ferner von Sumatra, Borneo und Formosa. Sie ist nicht gerade selten; der Verbreitungsbezirk ist aber nicht sehr gross.

MIOLISPA DISCORS Senna.

Miolispa discors SENNA, Ann. Soc. Ent. Belg. 39 (1895) 358.

MINDANAO, Provinz Lanao, Iligan, Cotabato (*Taylor; Baker*). NEGROS, Cuernos Mountains (*Baker*).

Die Verbreitung ist der vorigen Art ähnlich und nur etwas ausgedehnter: Penang, Borneo, Formosa, Celebes. Sicher ist sie auch auf Sumatra zu finden, doch hat mir kein Belegstück vorgelegen. Interessant ist der Fund von Celebes, mit dieser Insel besteht öfter Uebereinstimmung der Arten.

MIOLISPA ELONGATA Kleine.

Miolispa elongata KLEINE, Stett. Ent. Zeit. **80** (1919) 244, figs. 13–17.

LUZON, Manila (Sammler unbekannt). MINDANAO, Provinz Surigao, Surigao (*Baker*): Provinz Lanao, Mumungan, Kolambugan (*Boettcher*): Provinz Zamboanga, Zamboanga (*Baker*): Provinz Bukidnon, Tangkulan (*Boettcher*). NEGROS, Cuernos Mountains (*Baker*). BASILAN (*Baker*). PANAON (*Baker*).

Baker hat die Art ferner im nördlichen Borneo gesammelt. Der Verbreitungsbezirk scheint aber nur begrenzt zu sein und die Art muss in erster Linie als philippinisch angesprochen werden. Wenn sie auf Borneo häufiger wäre, hätte sie sich unter dem grossen Material das ich von Kina Balu gesehen habe wohl schon einmal gefunden, das ist aber nicht der Fall gewesen.

MIOLISPA EPHIPPIUM Kleine.

Miolispa ephippium KLEINE, Stett. Ent. Zeit. **80** (1919) 247, fig. 18.

LUZON, Provinz Tayabas, Malinao (*Baker*).

Endemische Art. Mir lagen später noch öfter Belegstücke vor, leider ohne näheren Fundort.

MIOLISPA FLAVOLINEATA Kleine.

Miolispa flavolineata KLEINE, Stett. Ent. Zeit. **80** (1919) 282, fig. 37.

LUZON, Provinz Laguna, Mount Banahao, Mount Maquiling (*Baker*): Provinz Nueva Vizcaya, Imugan (*Boettcher*). MINDANAO, Provinz Lanao, Iligan, Kolambugan (*Baker*). BASILAN (*Baker*). Endemische Art.

MIOLISPA FLEXILIS Kleine.

Miolispa flexilis KLEINE, Ent. Blätt. **19** (1923) 161.

SAMAR (*Baker*). MINDANAO, Provinz Agusan, Butuan (*Baker*): Provinz Lanao, Mumungan (*Boettcher*): Provinz Surigao, Surigao (*Boettcher*). Endemische Art.

MIOLISPA FORMOSA Kleine.

Miolispa formosa KLEINE, Ent. Blätt. **19** (1923) 160, figs. 2, 3.

MINDANAO, Provinz Agusan, Butuan (*Baker*). Endemische Art.

MIOLISPA FORNICATA Kleine.

Miolispa fornicata KLEINE, Ent. Blätt. **19** (1923) 161.

LUZON, Provinz Laguna, Mount Banahao (*Boettcher*): Provinz Nueva Vizcaya, Imugan (*Boettcher*). MINDANAO, Provinz

Lanao, Mumungan (*Boettcher*); Provinz Surigao, Surigao (*Boettcher*). LEYTE, Burauen (*Boettcher*). Endemische Art.

MIOLISPA FRAUDATRIX Kleine.

Miolispa fraudatrix KLEINE, Stett. Ent. Zeit. 80 (1919) 249, fig. 19.

LUZON, Provinz Tayabas, Malinao (*Baker*). Endemische Art.

MIOLISPA INTERMEDIA Senna.

Miolispa intermedia SENNA, Ann. Soc. Ent. Belg. 41 (1897) 239.

MINDANAO, Provinz Lanao, Iligan (*Baker*) : Provinz Surigao, Surigao (*Baker*).

Die Art ist nicht häufig aber doch recht weit verbreitet. Mir lagen Belegstücke vor von: Borneo, Java, Celebes und den Molukken (Amboina).

MIOLISPA LINEATA Senna.

Miolispa lineata SENNA, Not. Leyd. Mus. 20 (1898) 57.

MINDANAO, Provinz Agusan, Butuan (*Baker*).

Die Verbreitung dieser Art ist sicher nur ganz mangelhaft bekannt. Von Java sah ich sie sehr häufig und zwar von allen Teilen der Insel. Sie kommt auch auf der Malayischen Halbinsel vor, woraus zu schliessen ist, dass sie wenigstens auf Sumatra leben muss.

MIOLISPA PASCOEI Kleine.

Miolispa pascoei KLEINE, Stett. Ent. Zeit. 80 (1919) 226.

LUZON, Provinz Laguna, Mount Maquiling, Mount Banahao (*Baker*) : Provinz Tayabas, Malinao (*Baker*). MINDANAO, Provinz Agusan, Butuan (*Baker*) : Provinz Lanao, Iligan (*Baker*). Endemische Art.

MIOLISPA PAUCICOSTATA Kleine.

Miolispa paucicostata KLEINE, Stett. Ent. Zeit. 80 (1919) 312, fig. 52.

LUZON, Provinz Laguna, Mount Maquiling (*Baker*). Endemische, seltene Art.

MIOLISPA PERSIMILIS Kleine.

Miolispa persimilis KLEINE, Philip. Journ. Sci. 20 (1922) 154, t. 1, fig. 3.

MINDANAO, Provinz Lanao, Kolambugan (*Baker*) ; Mumungan (*Boettcher*). Endemische Art.

MIOLISPA PULCHELLA Kleine.

Miolispa pulchella KLEINE, Arch. Nat. A. 10, 87 (1921) 29.

LUZON, Subprovinz Benguet, Baguio (*Baker*) : Provinz Laguna, Mount Maquiling (*Baker*) : Provinz Nueva Vizcaya, Imugan (*Banks, Boettcher*).

MIOLISPA ROBUSTA Kleine.

Miolispa robusta KLEINE, Stett. Ent. Zeit. 80 (1919) 230, fig. 8.

LUZON, Provinz Laguna, Los Baños, Mount Banahao (*Boettcher*). CATANDUANES, Virac (*Boettcher*). MINDANAO, Provinz Davao, Davao, (*Baker*) : Provinz Surigao, Surigao (*Baker*) : Provinz Agusan, Butuan (*Baker*) : Provinz Lanao, Kolambugan, Iligan (*Baker*) ; Mumungan (*Boettcher*) ; San Miguel (*Boettcher*). MINDORO, Subaan (*Boettcher*). SIARGAO, Dapa (*Boettcher*). POLILLO (*Boettcher*). SAMAR (*Baker*). BASILAN (*Baker*).

Die Art ist sicher auf den Philippinen zu Hause. Das Auffinden auf Borneo (Sandakan) durch Baker beweist mir, dass die Verbreitung nur gering ist, sonst wären weitere Funde nachgewiesen. (cfr. *elongata*).

MIOLISPA SIPORABA Senna.

Miolispa siporaba SENNA, Ann. Mus. Genova (2) 19 (39) (1898) 233.

MINDANAO, Surigao, Surigao (*Baker*).

Eine der verbreitetsten Arten, die sich schon deutlich auf dem mehrfach skizzierten Wege von Westen nach Osten bewegt. Ich sah sichere Belegstücke von Malakka, Sumatra, Mentawei, Borneo, Java und den Molukken.

MIOLISPA UNICOLOR Kleine.

Miolispa unicolor KLEINE, Stett. Ent. Zeit. 80 (1919) 314, fig. 53.

FIG. 9. Verbreitungskarte der Gattung *Miolispa* Pascoe.

LUZON, Provinz Laguna, Mount Banahao (*Baker*) : Provinz Nueva Vizcaya, Imugan (*Boettcher*). Endemische Art.

Die Gattung *Miolispa* ist die artenreichste der ganzen Familie. Von den bekannten 65 Arten kommen 20 auf den Philippinen vor und davon 13 als Endemismen. Von den restlichen 8 müssen wenigstens noch 2 (*elongata* und *robusta*) als Philippinentiere angesprochen werden. Nur einige

lassen den bekannten Weg aus dem östlichen Verbreitungszentrum erkennen.

Das Verbreitungsareal der Gattung ist gross. Ceylon und Indien haben merkwürdigerweise keine Vertreter. Erst in Burmah finden sich die ersten Spuren, die aber auch nur als Ausläufer anzusehen sind. Das Verbreitungszentrum liegt auf dem südlichen Teil der Malayischen Halbinsel und den grossen Sunda-Inseln. Von hier aus ist starke Abwanderung sowohl nach den Philippinen wie nach Celebes und ins austro-malayische und australische Gebiet festzustellen. Bemerkenswert ist für die Gattung die Tatsache, dass sich so zahlreiche Arten mit kleinem Verbreitungskreis gebildet haben. Neigung zur Variation ist allgemein gering.

Genus HYPOMIOLISPA Kleine

Hypomiolispa KLEINE, Ent. Blätt. 14 (1918) 163.

HYPOMIOLISPA EXARATA Desbr.

Hypomiolispa exarata DESBR., Journ. Asiat. Soc. Beng. 2, Nat. Sc. No. 3 (1890) 223.

MINDANAO, Provinz Zamboanga, Zamboanga (*Baker*) : Provinz Lanao, Iligan (*Baker*) : Provinz Surigao, Surigao (*Baker*). SAMAR (*Baker*). BASILAN (*Baker*).

Ausser auf den Philippinen, Sumatra, Borneo und Java gefunden. Auf Sumatra und Java ist die Art sehr häufig, auf Borneo lässt die Besatzstärke näch und die Philippinen können nur noch als vorgeschobener Posten angesehen werden.

HYPOMIOLISPA HELLERI Kleine.

Hypomiolispa helleri KLEINE, Ent. Blätt. 14 (1918) 329.

MINDANAO, Provinz Davao, Davao (*Baker*) : Provinz Surigao, Surigao (*Baker*). BASILAN (*Baker*). Endemische Art.

HYPOMIOLISPA NUPTA Senna.

Hypomiolispa nupta SENNA, Not. Leyd. Mus. 14 (1892) 171.

LUZON, Provinz Tayabas, Malinao (*Baker*). MINDANAO, Provinz Lanao, Kolambugan, Mumungan (*Boettcher*) : Provinz Agusan, Butuan (*Baker*).

Eine der verbreitetsten Arten auf der West-Ost-Strasse sehr gut nachweisbar: Assam, Malayische Halbinsel, Sumatra, Borneo, Java, Mentawei.

HYPOMIOLISPA OCULARIS Kleine.

Hypomiolispa ocularis KLEINE, Proc. Hawaiian Ent. Soc. (1) 7 (1927) (1928) 57, figs. 2, 3.

LUZON, Provinz Laguna, Los Baños (Sammler unbekannt). Endemische Art.

HYPOMIOLISPA SPONSA Kleine.

Hypomiolispa sponsa KLEINE, Ent. Blätt. 14 (1918) 324.

MINDANAO, Provinz Surigao, Surigao (*Baker*): Provinz Lanao, Mumungan (*Boettcher*). SAMAR (*Baker*).

Diese mit *nupta* verwandte Art hat fast dieselbe Verbreitung: Malayische Halbinsel, Sumatra, Borneo, Java, Mentawei; die Westgrenze scheint aber schon in Selangor zu liegen.

HYPOMIOLISPA TOMENTOSA Kleine.

Hypomiolispa tomentosa KLEINE, Philip. Journ. Sci. 20 (1922) 156.

MINDANAO, Provinz Lanao, Iligan (*Baker*). Endemische Art.

HYPOMIOLISPA TRACHELIZOIDES Senna.

Hypomiolispa trachelizoides SENNA, Not. Leyd. Mus. 16 (1894) 193.

MINDANAO, Provinz Agusan, Butuan (*Baker*): Provinz Lanao, Iligan (*Baker*); Mumungan (*Boettcher*). SAMAR (*Baker*).

Verbreitung gleich *sponsa*, ausserdem noch auf Celebes gefunden. Verbreitungszentren sind die grossen Sunda-Inseln mit Sumatra als Hauptinsel.

Die Gattung umfasst 32 Arten. Mit *Miolispa* besteht einige, wenn auch entfernte, Verwandtschaft. Einige Arten waren früher bei *Miolispa* untergebracht. Ganz zu Unrecht. Die zoogeographischen Verhältnisse sind in beiden Gattungen total verschieden. *Miolispa* ist stark nach Osten, *Hypomiolispa* nach Westen orientiert. Nur im Verbreitungszentrum beider Gattungen, den Sunda-Inseln, treffen sie in etwa gleicher Stärke zusammen. In der auf den Philippinen festgestellten Artenzahl dokumentiert sich das Gesagte. Während *Miolispa* noch mit der ansehnlichen Zahl von 20 Arten vorkommt, hat es *Hypomiolispa* nur auf 7 gebracht, davon 2 Endemismen. Auf den Philippinen liegt auch die Ostgrenze der Verbreitung, nach Südosten ist die Gattung nicht vorgedrungen, Färbungselemente die auf Neu-Guinea hinweisen und die sich in der Gattung Miolispa mehrfach finden, fehlen ganz.

Genus HIGONIUS Lewis

Higonius LEWIS, Journ. Linn. Soc. Lond. Zool. 17 (1883) 299.

HIGONIUS CILO Lewis.

Higonius cilo LEWIS, Journ. Linn. Soc. Lond. Zool. 17 (1883) 300, t. 12, figs. 9, 10.

LUZON, Subprovinz Kalinga, Balbalasan (*Boettcher*). MASBATE, Aroroy (*Boettcher*).

Die Verbreitung dieser Art ist eigenartig: Indien, Burmah, Formosa, Japan. Von den Sunda-Inseln und Malakka, von wo ich so viel Material gesehen habe, ist sie mir niemals vorgekommen. Andere Arten, zum Beispiel, *crux*, haben sich auf dieser Strasse ausgebreitet. *Higonius* ist rein orientalisch.

Genus MICROTRACHELIZUS Senna

Microtrachelizus SENNA, Boll. Soc. Ent. Ital. 25 (1893) 315.

MICROTRACHELIZUS FLUXUS Kleine.

Microtrachelizus fluxus KLEINE, Ent. Blätt. 19 (1923) 162.

NEGROS, Cuernos Mountains (*Baker*). Endemische Art.

MICROTRACHELIZUS PUBESCENS Senna.

Microtrachelizus pubescens SENNA, Boll. Soc. Ent. Ital. 25 (1893) 320, t. 3, fig. 6.

NEGROS, Cuernos Mountains (*Baker*).

Weitere Fundorte sind bekannt von: Malakka (Perak) und Sumatra.

MICROTRACHELIZUS SIAMENSIS Kleine.

Microtrachelizus siamensis KLEINE, Journ. Fed. Malay Stat. Mus. 2 and 3, 13 (1926) 165, fig. 3.

SAMAR, Catbalogan (*Boettcher*).

Die Art lag mehrfach von der Malayischen Halbinsel vor, die Verbreitung dürfte sich mit der von *pubescens* decken.

MICROTRACHELIZUS TABACI Senna.

Microtrachelizus tabaci SENNA, Boll. Soc. Ent. Ital. 25 (1893) 323, t. 4, fig. 4.

MINDANAO, Provinz Zamboanga, Port Banga (*Boettcher*).

Weitverbreitete Art. Ich sah Belegstücke von: Burmah Malakka, Sumatra und Borneo. Der Autor nennt Neu-Guinea.

Die Gattung umfasst 27 Arten von denen 4 auf den Philippinen nachgewiesen sind. Die als Endemisme bezeichnete Art

ist wahrscheinlich auch noch auf den Sunda-Inseln zu finden. Die allgemeine Verbreitung ist folgende: 6 Arten sind æthiopisch und zeigen noch die Herkunft an, 15 sind rein orientalisch, 3 gehören dem austro-malayischen beziehungsweise dem australischen Gebiet an und 3 kommen in sehr grosser Migration über meherer Gebiete vor. Die æthiopischen Vertreter der Gattung sind in sich abgeschlossen sind aber habituel mit den anderer Regionen absolut übereinstimmend. Die philippinischen Arten sind nur Ausläufer des auf den Sunda-Inseln liegenden Massivs der orientalischen Arten und sind zoogeographisch ohne Belang. Von Bedeutung ist der Nachweis der Afrikaner. *Microtrachelizus* ist übrigens nicht die einzige Gattung die noch in Afrika Vertreter hat. Es sei nur auf *Araiorrhynchus* verwiesen, die allerdings die Philippinen nicht erreicht hat.

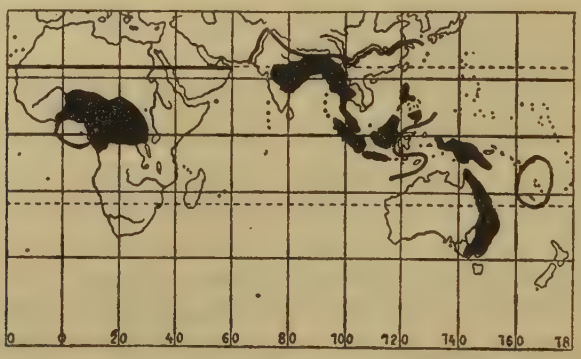


FIG. 10. Verbreitungskarte der Gattung *Microtrachelizus* Senna.

Genus HOPLOPISTHIUS Senna

Hoplopisthius SENNA, Ann. Mus. Genova (2) 12 (33) (1892) 451.

HOPLOPISTHIUS TRICHIMERUS Senna.

Hoplopisthius trichimerus SENNA, Ann. Mus. Genova (2) 12 (33) (1892) 451.

LUZON, Provinz Laguna, Mount Maquiling (*Baker*). PALAWAN, Puerto Princesa (*Baker*).

Sehr verbreitete Art. Folgende Fundorte sind bekannt: Assam, Burmah, Malayische Halbinsel, Sumatra, Borneo, Java, Mentawei, Bali, Nias, Formosa.

Eine zweite Art ist von Celebes bekannt. Der Uebergang von den Sunda-Inseln über Palawan nach den Philippinen ist wichtig.

AMORPHOCEPHALINI

Genus CORDUS Schoenherr

Cordus SCHOENHERR, Mant. Insec. Curc. (1847) 10.

CORDUS PEGUANUS Senna.

Cordus peguanus SENNA, Ann. Mus. Genova (2) 12 (32) (1892) 463.

NEGROS, Cuernos Mountains (*Baker*). BASILAN (*Baker*). Weitere Verbreitung: Burmah, Malakka, Sumatra.

Die Gattung ist dadurch interessant, dass sie in sehr weiter Verbreitung vorkommt und dazwischen in grossen Gebieten wieder ganz fehlt. Zehn Arten sind æthiopisch, 2 orientalisch, 1 ist von Neu-Guinea bekannt und 7 sind Australier. Das schwache Auftreten im orientalischen Gebiet ist noch ganz ungeklärt. Das Areal von Malakka und den grossen Sunda-Inseln ist so intensiv durchforscht, dass längst ein *Cordus* bekannt geworden wäre, wenn einer vorhanden wäre. Andere Amorphocephalini sind doch mehrfach aufgefunden. Diese Gattung muss einen Weg genommen haben, der heute nicht nehr erkennbar und in den einzelnen Erdperioden verloren gegangen ist. Das sich auf den Philippinen nicht einmal eine eigene Art fand, ist merkwürdig, zeigt aber, dass einzelne Arten eine recht grosse Verbreitung haben können. Jedenfalls ist der *Cordus* von den Philippinen ein sehr interessanter Fall.

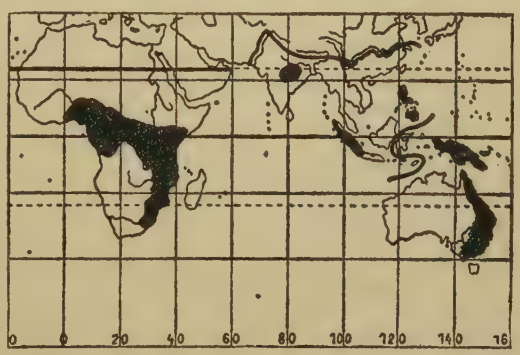


FIG. 11. Verbreitungskarte der Gattung *Cordus* Schoenh.

Genus LEPTAMORPHOCEPHALUS Kleine

Leptamorphocephalus KLEINE, Arch. Nat. A. 12, 82 (1916) (1918) 132.

LEPTAMORPHOCEPHALUS FŒDERATUS Kleine.

Leptamorphocephalus fœderatus KLEINE, Ent. Blätt. 19 (1923) 163.

NEGROS, Cuernos Mountains (*Baker*). Endemische Art.

Die 9 Arten umfassende Gattung ist rein orientalisch, mit ihrer Hauptstärke auf der Malayischen Halbinsel und Sumatra; *fœderatus* ist ein vorgeschobener Posten.

TABELLE 5.—*Verbreitungstabelle der Trachelizini.*

	Ceylon.	Indien.	Bengalen.	Malay-Halbinsel.	Sumatra.	Borneo.	Java.	Indo-China.	Formosa.	Japan.	Celebes.	Molukken.	Neu-Guinea.	Australien.	Polynesien.
Homophylus mindanensis Kleine [a]															
Metatrachelizus constanis Kleine												+			
Trachelizus bisulcatus Fabricius	+	+	+	+	+	+	+	+	+	+					
Miolispa bicolor Kleine [a]															
Miolispa clavicornis Kleine [a]															
Miolispa crucicta Senna					+	+			+		+				
Miolispa discors Senna				+		+			+						
Miolispa elongata Kleine															
Miolispa ephippium Kleine [a]															
Miolispa flavolineata Kleine [a]															
Miolispa flexilis Kleine [a]															
Miolispa formosa Kleine [a]															
Miolispa fornicata Kleine [a]															
Miolispa fraudatrix Kleine [a]															
Miolispa intermedia Senna						+	+				+	+			
Miolispa lineata Senna				+											
Miolispa pascoei Kleine [a]															
Miolispa pauciostata Kleine [a]															
Miolispa persimilis Kleine [a]															
Miolispa pulchella Kleine [a]															
Miolispa robusta Kleine						+	+								
Miolispa siporana Senna				+	+	+	+					+			
Miolispa unicolor Kleine [a]															
Hypomiolispa exarata Desbr.					+	+	+								
Hypomiolispa heileri Kleine [a]															

| | | |

Genus PARAMORPHOCEPHALUS Kleine

Paramorphocephalus KLEINE, Zool. Meded. Leid. 4, 5 (1920) 236.

PARAMORPHOCEPHALUS SETOSUS Kleine.

Paramorphocephalus setosus KLEINE, Philip. Journ. Sci. 28 (1925) 597, taf. 1, fig. 4.

SAMAR (*Baker.*) Endemische Art.

Die Amorphocephalini sind Myrmecophile, ihre Verbreitung ist also immer mehr oder weniger von der ihrer Wirtstiere abhängig. Letztere sind leider nur erst ganz wenig bekannt. Auf den Philippinen ist die Tribus sicher nur ganz schwach vertreten. Jahrelang haben mir überhaupt keine Vertreter vorgelegen, erst später konnte ich den Nachweis erbringen, dass sich auch auf diesen vorgeschobenen Posten myrmecophile Brenthiden finden. Es handelt sich in jedem Fall um Vorposten aus dem orientalischen Massiv, das sich um die Malayische Halbinsel und Sumatra konzentriert. Nach den Rändern des Gebietes lässt die Artstärke nach. Etwa die Hälfte aller Amorphocephalini leben in Afrika. Keine Tribus der ganzen Familie hat übrigens eine derartige West-Ost-Ausdehnung wie die Amorphocephalini: Bucht von Guinea bis Tahiti!

ARRHENODINI

Genus AGRIORRHYNCHUS Power

Agriorrhynchus POWER, Pet. Nouv. Ent. 2 (1878) 241.

AGRIORRHYNCHUS IGNARIUS Kleine.

Agriorrhynchus ignarius KLEINE, Philip. Journ. Sci. 28 (1925) 598, t. 1, figs. 5–7.

LUZON, Provinz Laguna, Los Baños (*Banks*). Endemische Art.

Vier Arten sind bekannt, alle sind Orientalen die westlich nicht über Burmah hinausgehen. Verbreitungszentrum sind die grossen Sunda-Inseln.

Genus EUPEITHES Senna

Eupeithes SENNA, Ann. Mus. Genova (2) 19 (39) (1898) 381.

EUPEITHES DOMINATOR Kleine.

Eupeithes dominator KLEINE, Ent. Blätt. 17 (1921) 125, fig. 4.

MINDANAO, Provinz Surigao, Surigao (*Baker*). SAMAR, Wright (*McGregor*). Endemische Art.

Vier Arten sind bekannt. Ueber die Verbreitung gilt das bei *Agriorrhynchus* Gesagte.

Genus PROPHTHALMUS Lacordaire

Prophthalmus LACORDAIRE, Gen. Col. 7 (1866) 427.

PROPHTHALMUS LONGIROSTRIS Gyllenhal.

Prophthalmus longirostris GYLLENHAL, Schoenh. Gen. Curc. 1 (1833) 323.

LUZON, Provinz Laguna, Mount Banahao (*Baker*).

Auf den Sunda-Inseln gemein, ferner von der Malayischen Halbinsel und Celebes bekannt. Es ist in der Gattung die Art mit grösster Migration.

PROPHTHALMUS TRICOLOR Power.

Prophthalmus tricolor POWER, Ann. Soc. Ent. Fr. (5) 8 (1878) 38.

LUZON, Provinz Camarines Sur, Mount Isarog (*Boettcher*); Provinz Laguna, Mount Maquiling (*Baker*), Mount Banahao, Los Baños, Paete (*Boettcher*): Provinz Ilocos Norte, Bangui (*Boettcher*): Provinz Pampanga, Arayat (*Boettcher*). CATANDUANES, Virac (*Boettcher*). MINDANAO, Provinz Surigao, Surigao (*Boettcher*): Provinz Lanao, Mumungan (*Boettcher*). SIARGAO, Dapa and Cabuntog (*Boettcher*). NEGROS, Cuernos Mountains (*Baker*). SAMAR (*Baker*). LEYTE (*Boettcher*). SIBUYAN (*Baker*).

Die Art ist auf den Philippinen eine der häufigsten Brenthiden, die sicher auf allen Inseln zu finden ist. Die Art kommt ferner auf Celebes und auf den Molukken vor (Ceram, Buru, Amboina). Es haben sich Rassen gebildet, die aber keine geographischen Schlüsse zulassen.

Von den bekannten 17 Arten ist nur eine austromalayisch, alle anderen sind orientalisch.

Genus BARYRRHYNCHUS Lacordaire

Baryrrhynchus LACORDAIRE, Gen. Col. 7 (1866) 428.

BARYRRHYNCHUS SCHROEDERI Kleine.

Baryrrhynchus schroederi KLEINE, Stett. Ent. Zeit. (1914) 172.

LUZON, Provinz Laguna, Mount Maquiling, Los Baños (*Baker*); Mount Banahao (*Boettcher*): Subprovinz Kalinga, Balbalasan (*Boettcher*). MINDANAO, Provinz Agusan, Agusan (*Weber*): Provinz Surigao, Surigao (*Boettcher*): Provinz Lanao, Mumungan, Kolambugan (*Boettcher*). NEGROS, Cuernos Mountains (*Baker*). SIBUYAN (*Baker*). SAMAR (*Baker*).

FIG. 12. Verbreitungskarte der Gattung *Baryrrhynchus* Lacord.

Baryrrhynchus schroederi ist eine der interessantesten Arten in der Gattung, denn sie hat eine Verbreitung wie keine andere. Ich sah sie auf folgender Linie: Siam-Philippinen-Celebes-Molukken-Neu-Guinea-Neu-Pommern. Sie umgeht also das orientalische Gebiet, denn der Vorstoss gegen Siam hat ganz bestimmt nicht über die Sunda-Inseln stattgefunden, sondern über Indo-China, wo die Art sehr wahrscheinlich noch aufgefunden wird. Sie ist auch in der Ausfärbung ganz appart. Von den 18 Arten sind 11 orientalisch, 7 gehören dem austro-malayischen beziehungsweise australischen Gebiet an. Die Orientalen haben keine Fühlung mit den östlichen Arten.

Genus EUPSALIS Lacordaire

Eupsalis LACORDAIRE, Gen. Col. 7 (1866) 430.

EUPSALIS KLEINEI K. M. Heller.

Eupsalis kleinei K. M. HELLER, Philip. Journ. Sci. 19 (1921) 624, t. 3, figs. 13, 14.

MINDANAO, Provinz Davao, Davao (im Museum Dresden, wahrscheinlich von Baker gesammelt). Endemische Art.

Die Gattung ist kein einheitlicher Typ. Die auf den Molukken, auf Neu-Guinea und Australien lebenden Arten sind der Untergattung *Schizœupsalis* zuzuweisen. Hierher gehört auch *kleinei* Heller. Die Beeinflussung durch östlicher Elemente ist ganz sicher, die beiden orientalischen Arten, von denen eine nur in Indien vorkommt, sind ohne Einfluss geblieben. Die Hauptmasse, 18 Arten, sind æthiopisch mit Ausstrahlung ins mediterrane Gebiet. Die orientalen gehören habituel noch dem afrikanischen Artmassiv an, die von den Philippine südlich und

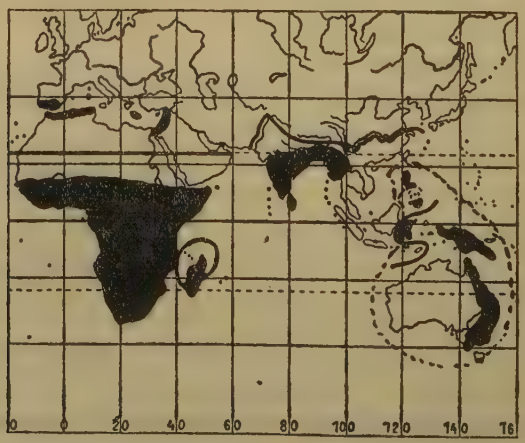


FIG. 13. Verbreitungskarte der Gattung *Eupsalis* Lacord.

südöstlich vorkommenden Arten bilden einen eigenen Verwandtschaftskreis. Sie sind am besten von *Eupsalis* zu trennen.

Genus CÆNORYCHODES Kleine

Cænorychodes KLEINE, Arch. Nat. A. 9, 86 (1920) 87.

CÆNORYCHODES SERRIROSTRIS Fabricius.

Cænorychodes serrirostris FABRICIUS, Syst. El. 2 (1801) 553.

LUZON, Provinz Laguna, Mount Maquiling (*Baker*). MASBATE, Aroroy (*Boettcher*). MINDANAO, Provinz Agusan, Agusan River (*Weber*): Provinz Lanao, Iligan, Mumungan, Kolambugan, (*Boettcher*): Provinz Cotabato, Cotabato (*Taylor, Baker*). LEYTE (*Boettcher*). SIARGAO, Dapa (*Boettcher*). SAMAR (*Baker*). BASILAN (*Baker*).

Weitverbreitete gemeine Art, die sich durch ihr grosses Migrationsvermögen bis Celebes vorgeschoben hat. Verbreitungsgebiet: Malakka, Sumatra, Borneo, Java, Batu, Bali, Indo-China, Formosa, Obir.

CÆNORYCHODES SPLENDENS Kirsch.

Cænorychodes splendens KIRSCH., Mitt. Zool. Mus. Dres. 1 (1875) 50 nota.

LUZON, Provinz Laguna, Mount Banahao (*Boettcher*): Provinz Camarines Sur, Mount Isarog (*Boettcher*). MASBATE, Aroroy (*Boettcher*). NEGROS, Cuernos Mountains (*Baker*). SIBUYAN (*Baker*). Endemische Art.

FIG. 14. Verbreitungskarte der Gattung *Caenorychodes* Kln.

Zwölf Arten sind bekannt, davon sind 6 orientalisch, 6 austromalayisch. Die Arten haben allgemein wenig Neigung zu Migration, nur *serrirostris* ist weiter verbreitet.

FIG. 15. Verbreitungskarte der Gattung *Pseudorychodes* Senna.

Genus PSEUDORYCHODES Senna

Pseudorychodes SENNA, Ann. Soc. Ent. Belg. 38 (1894) 375.

PSEUDORYCHODES PRÆCLARUS Kleine.

Pseudorychodes præclarus KLEINE, Philip. Journ. Sci. 28 (1925) 600, t. 1, fig. 8.

MINDANAO, Provinz Surigao (*Boettcher*). Endemische Art.

Von den 13 Arten sind 11 orientalisch, 1 ist von Celebes, 1 von Japan. Bei keiner Art ist grosse Migration erkennbar.

Genus AMPHICORDUS K. M. Heller

Amphicordus K. M. HELLER, Philip. Journ. Sci. § D 8 (1913) 151.

AMPHICORDUS IMPROPORTIONALIS K. M. Heller.

Amphicordus improportionalis K. M. HELLER, Philip. Journ. Sci. § D 8 (1913) 152, fig. 7.

MINDANAO ohne näheren Fundort (Museum Dresden); Provinz Lanao, Kolambugan (*Banks*). Nur diese eine, endemische, Art ist bekannt.

TABELLE 6.—*Verbreitungstabelle der Arrhenodini.*

	Indo-China.	Formosa.	Malay-Halbinsel.	Sumatra.	Borneo.	Java.	Celebes.	Molukken.	Neu-Guinea.
Agriorrhynchus ignarius Kleine [a]	—	—	—	—	—	—	—	—	—
Eupeithes dominator Kleine [a]	—	—	—	—	—	—	—	—	—
Prophthalmus longirostris Gyllenhal	—	—	+	+	+	+	+	—	—
Prophthalmus tricolor Power	—	—	—	—	—	—	+	+	—
Baryrrhynchus schroederi Kleine	+	—	+	—	—	—	+	+	+
Eupsalis kleinei Heller [a]	—	—	—	—	—	—	—	—	—
Cænorychodes serrirostris Fabricius	+	+	+	+	+	+	+	—	—
Cænorychodes splendens Kirsch [a]	—	—	—	—	—	—	—	—	—
Pseudorychodes præclarus Kleine [a]	—	—	—	—	—	—	—	—	—
Amphicordus improportionalis Heller [a]	—	—	—	—	—	—	—	—	—

[a] Endemisch.

Von den 195 bekannten Arrhenodini sind 90 orientalisch. Der Bestand auf den Philippinen mit nur 10 Arten ist also sehr gering. Schuld mag daran der Umstand mit sein, das in der Tribus so wenig Neigung zu Migration besteht.

BELOPHERINI

Genus YPSELOGONIA Kleine

Ypselogonia KLEINE, Philip. Journ. Sci. 20 (1922) 157.

YPSELOGONIA PEREGRINA Kleine.

Ypselogonia peregrina KLEINE, Philip. Journ. Sci. 20 (1922) 158, t. 1, fig. 1.

MINDANAO, Provinz Zamboanga, Dapitan (*Baker*). Endemische Art.

Eine zweite Art kommt in Formosa und Borneo vor.

Genus HETEROBLYSMIA Kleine

Heteroblysmia KLEINE, Ent. Blätt. 13 (1917) 285.

HETEROBLYSMIA ACCURATA Kleine.

Heteroblysmia accurata KLEINE, Arch. Nat. A. 3, 88 (1922) 215.

MINDANAO, Provinz Lanao, Kolambugan (*Boettcher*).

Die Art habe ich mehrfach von Borneo gesehen, wo sicher das Verbreitungszentrum liegt. Es wäre von Interesse festzustellen, ob sich *accurata* nicht auch auf Palawan findet.

HETEROBLYSMIA ELECTA Kleine.

Heteroblysmia electa KLEINE, Ent. Blätt. 19 (1923) 164, figs. 5, 6.

Näherer Fundort fehlt. Endemische Art.

HETEROBLYSMIA FORMIDOLOSA Kleine.

Heteroblysmia formidolosa KLEINE, Ent. Blätt. 19 (1923) 165, fig. 7.

NEGROS, Cuernos Mountains (*Baker*). Endemische Art.

Acht Arten sind bekannt, rein orientalisch und meist von den Sunda-Inseln.

Genus APOCEMUS Calabresi

Apocemus CALABRESI, Boll. Soc. Ent. Ital. 53 (1929) 58.

APOCEMUS IGNOBILIS Kleine.

Apocemus ignobilis KLEINE, Philip. Journ. Sci. 28 (1925) 602, t. 1, fig. 9.

LUZON, Provinz Bataan, Lamao (*Carpenter*). Endemische Art. Eine zweite Art ist von Malakka bekannt.

Genus HENARRHENODES K. M. Heller

Henarrhenodes K. M. HELLER, Philip. Journ. Sci. § D 8 (1913) 152.

HENARRHENODES MACGREGORI K. M. Heller.

Henarrhenodes macgregori K. M. HELLER, Philip. Journ. Sci. § D 8 (1913) 153, fig. 8.

LUZON, Subprovinz Benguet, Irisan River (*Baker*): Provinz Nueva Vizcaya, Imugan (*Baker*): Provinz Laguna, Mount Maquiling (*Baker*). MINDANAO, Provinz Lanao, Kolambugan (*Baker*). SIARGAO, Cabuntog (*Boettcher*). NEGROS, Cuernos Mountains (*Baker*). POLILLO (Sammler unbekannt, wahrscheinlich *Baker*).

Es sind noch 2 orientalische Arten bekannt. Die philippinische Art ist dadurch ausgezeichnet, dass sie den Ausfärbungstyp der Neu-Guinea-Tiere hat.

Genus ECTOCEMUS Pascoe

Ectocemus PASCOE, Journ. Ent. 1 (1862) 388.

ECTOCEMUS BADENI Kirsch.

Ectocemus badeni KIRSCH, Ent. Mitt. Mus. Dresden 1 (1875) 48.

LUZON, Provinz Laguna, Mount Banahao (*Baker*). MINDANAO, Provinz Lanao, Kolambugan (*Banks*): Surigao (*Baker*).

Die Gattung umfasst 5 Arten, 3 sind orientalisch, 2 austromalayisch oder australisch.

Genus ANEPSIOTES Kleine

Anepsiotes KLEINE, Ent. Mitt. 10–12, 6 (1917) 318.

ANEPSIOTES LUZONICUS Calabresi.

Anepsiotes luzonicus CALABRESI, Boll. Soc. Ent. Ital. 51 (1919) 66, t. 2, fig. 3.

LUZON (Coll. *Senna*). Endemische Art.

ANEPSIOTES NITIDICOLLIS Calabresi.

Anepsiotes nitidicollis CALABRESI, Boll. Soc. Ent. Ital. 51 (1919) (1929) 69, t. 2, fig. 4.

MANILA (Coll. *Senna*). Endemische Art.

Die Gattung umfasst 7 orientalische Arten mit geringer Migration.

TABELLE 7.—*Verbreitungstabelle der Belopherini.*

	Borneo.	Celebes.
Ypselogonia peregrina Kleine [a]	—	—
Heteroblysmia accurata Kleine	+	—
Heteroblysmia electa Kleine [a]	—	—
Heteroblysmia formidolosa Kleine [a]	—	—
Apocemus ignobilis Kleine [a]	—	—
Ectocemus badeni Kirsch	—	+
Anepsiotes luzonicus Calabresi [a]	—	—
Anepsiotes nitidicollis Calabresi [a]	—	—

[a] Endemisch.

Die Belopherini sind von den bisher behandelten Tribus grundsätlich dadurch unterschieden, dass die nicht westlicher, sondern südöstlicher Provenienz sind. Die Tribus findet sich circumpolar auf der ganzen südlichen Hemisphäre mit Ausnahme von Afrika (wohl aber in Madagaskar). Der heute noch deut-

lich erkennbare Wanderzug der in die orientalische Region gekommen ist stammt aus dem Neu-Guinea-Massiv, auf das ich schon mehrfach hingewiesen habe. Von hieraus hat auch die Besiedelung der Philippinen stattgefunden, reine Typen Neu-Guineas finden sich und der Mangel jeder Anlehnung an die orientalische Region lassen das auch deutlich erkennen. Von 96 bekannten Arten sind 34 in die orientalische Region vorgedrungen und haben dort zum Teil ganz neue Formen gebildet.

ITHYSTENINI

Genus ACHRIONOTA Pascoe

Achrionota PASCOE, Ann. & Mag. Nat. Hist. (4) 10 (1872) 325.

ACHRIONOTA BILINEATA Pascoe.

Achrionota bilineata PASCOE, Ann. & Mag. Nat. Hist. (4) 10 (1872) 325, t. 15, fig. 4.

MINDANAO, Provinz Zamboanga, Dapitan (*Baker*).

Weiter haben mir folgende Fundorte vorgelegen: Malakka, Sumatra, Borneo.

ACHRIONOTA SPINIFER Kleine.

Achrionota spinifer KLEINE, Arch. Nat. A, 10, 87 (1921) 36, figs. 2, 3.

MINDANAO, Provinz Surigao, Surigao (*Baker*). SIARGAO, Dapa (*Boettcher*). LEYTE (*Boettcher*). PANAON (*Boettcher*). BOHOL, Bilar (*Ramos*). POLILLO (*McGregor*). Endemische Art. Eine dritte Art kommt endemisch auf Celebes vor.

Genus CEDIOCERA Pascoe

Cediocera PASCOE, Ann. & Mag. Nat. Hist. (5) 20 (1887) 20.

CEDIOCERA TRISTIS Senna.

Cediocera tristis SENNA, Not. Leyd. Mus. 14 (1892) 181.

NEGROS, Cuernos Mountains (*Baker*). BASILAN (*Baker*).

Die Gattung umfasst 2 Arten, die aber nicht sicher trennbar und die vielleicht nur Rassen einer Art sind. Es ist übrigens die einzige Gattung die einen mehr orientalischen Charakter hat. *Tristis* hat eine grosse Migration und kommt bis Neu-Guinea vor. Die ursprüngliche Herkunft ist also noch immer erkennbar. Mir lagen Belegstücke vor von: Malakka, Sumatra, Borneo, Java, Neu-Guinea.

Genus HETEROPLITES Lacordaire

Heteroplites LACORDAIRE, Gen. Col. 7 (1866) 471.

HETEROPLITES ERYTHRODERES Boheman.

Heteroplites erythroderes BOHEMAN, Schoenh. Gen. Curc. 5 (1840) 564.

LUZON, Provinz Ilocos Norte, Bangui (*Banks*) : Provinz Nueva Vizcaya, Imugan (*Boettcher*) : Provinz Laguna, Mount Banahao (*Boettcher*) : Provinz Camarines Sur, Mount Isarog, Balagbag (*Boettcher*). MINDANAO, Provinz Surigao, Surigao (*Boettcher*) : Provinz Bukidnon, Tangkulan (*Boettcher*). Ballalon (?) (*Boettcher*). Endemische Art. Färbung des Neu-Guinea Typs. Eine zweite Art lebt auf Celebes mit Ausstrahlung nach Borneo.

Genus DIURUS Pascoe

Diurus PASCOE, Journ. Ent. 1 (1862) 392.

DIURUS FURCILLATUS Gyllenhal.

Diurus furcillatus GYLLENHAL, Schoenh. Gen. Curc. 1 (1833) 359.

MINDANAO, Provinz Surigao, Surigao (*Baker*) : Provinz Davao, Davao (*Weber*). MINDORO, Baco River (*McGregor*). LUZON, Ilocos Norte, Bangui (*Banks*). SAMAR (*Baker*).

Die gemeinste Art mit grösster Migration, Malakka, Sumatra, Borneo, Java. Ueberall gleich häufig.

DIURUS PHILIPPINICUS Senna.

Diurus philippinicus SENNA, Boll. Soc. Ent. Ital. 41 (1909) 45.

Endemische Art, näherer Fundort nicht angegeben.

DIURUS SAMARENSIS Kleine.

Diurus samarensis KLEINE, Stett. Ent. Zeit. 87 (1926) 370, fig. 16.

SAMAR (*Baker*). Endemische Art.

DIURUS SHELFORDI Senna.

Diurus shelfordi SENNA, Proc. Zool. Soc. Lond. (1902) 279, t. 20, fig. 6 ♀.

MINDANAO, Provinz Lanao, Kolambugan (*Baker*). BASILAN (*Baker*). Ausserdem von Borneo bekannt.

Diurus umfasst 25 Arten die mit geringen Ausnahmen orientalisch sind. In Neu-Guinea ist eine Art sicher nachgewiesen. Auch auf den Carolinen soll eine vorkommen, es hat sie ausser dem Autor wohl niemand gesehen. Diese Art bleibt unklar. Auffällig ist das gänzliche Fehlen auf den Molukken, so dass vorläufig noch kein Anschluss der Orientalen an die Neu-Guinea-

Art möglich war. Vielleicht ist die Zuwanderung über die kleinen Sunda-Inseln erfolgt und die Molukken sind tatsächlich unberührt geblieben.

Was bei den Belopherini über Herkunft und gegenwärtige Verteilung der Arten gesagt ist, tifft auch hier zu. Ja es ist die Beteiligung des Ausgangszentrums. Neu-Guinea Molukken mit den ostlichen Inselschwärmen und Australien noch deutlicher als bei den Belopherini. Von den 112 Arten sind 51 austro-malayisch oder australisch, 30 gehören der orientalischen, 22 der neotropischen Region an. Zu den Austromalayen dürfte eine Art mit Ausstrahlung in die orientalische Region zu rechnen sein, von einer ist der Fundort nicht sicher.

Mehrfach finden sich unter den wenigen Arten solche mit Neu-Guinea-Färbung, also ganz analog den Verhältnissen bei den Belopherini.

TABELLE 8.—*Verbreitungstabelle der Ithystenini.*

	Malay-Halbinsel.	Sumatra.	Borneo.	Java.	Neu-Guinea.
Achrionota bilineata Pascoe	+	+	+	—	—
Achrionota spinifer Kleine [a]	—	—	—	—	—
Cediocera tristis Senna	+	+	+	+	+
Heteroplites erythroderes Boheman [a]	—	—	—	—	—
Diurus furcillatus Gyllenhal	+	+	+	+	—
Diurus philippinicus Senna [a]	—	—	—	—	—
Diurus samarensis Kleine [a]	—	—	—	—	—
Diurus shelfordi Senna	—	—	+	—	—

[a] Endemisch.

PSEUDOCEOCEPHALINI

Genus OPISTHENOPLUS Kleine

Opisthenoplus KLEINE, Deut. Ent. Zeit. 1 (1922) 139.

OPISTHENOPLUS CALABRESII Kleine.

Opisthenoplus calabresii KLEINE, Arch. Nat. A. 10, 87 (1921) 35.

LUZON, Subprovinz Kalinga, Balbalasan (*Boettcher*), mehrfach ohne näheren Fundort gesehen. Endemische Art mit Ausfärbung des Neu-Guinea Typs.

OPISTHENOPLUS CAVUS F. Walker.

Opisthenoplus cavus F. WALKER, Ann. & Mag. Nat. Hist. (3) 3 (1859) 262.

LUZON, Provinz Laguna, Mount Banahao (*Boettcher*) : Provinz Nueva Vizcaya, Imugan (*Boettcher*). MINDANAO, Provinz Su-

rigao, Surigao (*Boettcher*); Provinz Lanao, Mumungan (*Boettcher*). NEGROS, Cuernos Mountains (*Baker*).

Häufige, weitverbreitete Art die in der ganzen orientalischen Region vorkommt. Ich sah Belegstücke von: Ceylon, Indien, Burmah, Andamanen, Indo-China, Malakka, Sumatra, Borneo. Hauptgebiet ist Indien. Von Java sah ich die Art noch nicht.

OPISTHENOPLUS FASCINATUS Kleine.

Opisthenoplus fascinatus KLEINE, Deut. Ent. Zeit. 1 (1922) 140, figs. 7, 8.

LUZON, Provinz Laguna, Mount Banahao (*Baker*).

Die Verbreitung der Art ist wohl nur erst zum Teil bekannt. Mir lagen belegstücke vor von: Sumatra, Indien, Formosa. Das Verbreitungszentrum lässt sich zur Zeit nicht angeben.

OPISTHENOPLUS FECUNDUS Kleine.

Opisthenoplus fecundus KLEINE, Ent. Blätt. 19 (1923) 165.

NEGROS, Cuernos Mountains (*Baker*). Endemische Art.

OPISTHENOPLUS MADENS Lacordaire.

Opisthenoplus madens LACORDAIRE, Gen. Col. 7 (1866) 455, nota 2.

SIBUYAN (Sammler unbekannt).

Die Verbreitung von *madens* hat einige Aehnlichkeit mit der von *cavus*. Das eigentliche Zentrum muss aber mehr östlich liegen, da mir noch niemals ein Belegstück aus Indien vorgelegen hat. Ich sah die Art von: Malakka, Andamanen, Indo-China, Sumatra und Java. Die Ausbreitung nach Südosten ist also auch grösser als bei *cavus*.

Die 9 bekannten Arten sind orientalisch.

FIG. 16. Verbreitungskarte der Gattung *Hormocerus* Schoenh.

Genus HORMOCERUS Schoenherr

Hormocerus SCHOENHERR, Curc. Disp. (1826) 70.

HORMOCERUS RETICULATUS Fabricius.

Hormocerus reticulatus FABRICIUS, Syst. El. 2 (1801) 552.

Diese gemeine, von Ceylon bis Ost-Australien überall vorkommende Art hat zahlreiche Rassen gebildet, die meist ineinander übergehen. Die von Boheman als *scrobicollis* beschriebene Art kommt auf den Philippinen vor und man findet in älteren Sammlungen häufig zahlreiche Belegstücke. Baker und Boettcher haben die Art nicht gefunden. Es ist doch merkwürdig, dass diese ausgezeichneten Sammler das Tier nicht gefunden haben.

Genus APTERORRHINUS Senna

Apterorrhinus SENNA, Not. Leyd. Mus. 17 (1895) 59.

APTERORRHINUS COMPRESSITARSIS Senna.

Apterorrhinus compressitarsis SENNA, Not. Leyd. Mus. 17 (1895) 61.

LUZON, Provinz Ilocos Norte, Bangui (*Boettcher*). SIARGAO, Dapa (*Boettcher*). LEYTE (*Boettcher*).

Sehr weitverbreitete, aber nicht häufige Art. Ich sah Tiere von: Malakka, Sumatra, Java, Buru.

APTERORRHINUS ALBATUS Kleine.

Apterorrhinus albatus KLEINE, Arch. Nat. A. 3, 87 (1921) 226.

LUZON, Provinz Laguna, Mount Maquiling (*Baker*).

Auch hier ist die Verbreitung noch ganz unübersichtlich. Mir lagen Belegstücke von Neu-Guinea und Queensland vor.

Genus SCHIZOTRACHELUS Lacordaire

Schizotrachelus LACORDAIRE, Gen. Col. 7 (1866) 454.

SCHIZOTRACHELUS ANGULATICEPS Senna.

Schizotrachelus angulaticeps SENNA, Boll. Soc. Ent. Ital. 31 (1899) 308.

LUZON, Subprovinz Kalinga, Balbalasan (*Boettcher*) : Provinz Nueva Vizcaya, Imugan (*Boettcher*) : Provinz Ilocos Norte, Bangui (*Boettcher*). NEGROS, Cuernos Mountains (*Baker*). LEYTE, Burauen (*Boettcher*). SAN MIGUEL (*Boettcher*). BASILAN (*Baker*).

Weitere Funde sind bekannt von: Malayische Halbinsel, Borneo, Celebes. Die Funde sind noch zu sporadisch und geben keinen Ueberblick über die Verbreitung.

SCHIZOTRACHELUS BAKERI Kleine.

Schizotrachelus bakeri KLEINE, Arch. Nat. A. 10, 87 (1921) 33.

(*a*) Nominatform.

LUZON, Provinz Laguna, Los Baños (Sammler unbekannt) : Mount Banahao (*Boettcher*) : Subprovinz Benguet, Baguio (*Baker*). CATANDUANES, Virac (*Boettcher*). NEGROS, Oriental Negros, Cuernos Mountains (*Baker*) : Occidental Negros, Fabrica (*Schultze*). SIBUYAN (*Baker*). POLILLO (*Baker*).

(*b*) Forma *concolor.*

LUZON, Provinz Laguna, Mount Banahao, Los Baños (*Baker*) : Provinz Nueva Vizcaya, Imugan (*Boettcher*). MINDANAO, Surigao, Surigao (*Baker*) : Provinz Lanao, Kolambugan, Iligan (*Baker*). SIARGAO, Cabuntog (*Boettcher*). NEGROS (*Baker*).

SAMAR (*Baker*). BASILAN (*Boettcher*). Endemische, aber wie es scheint, auf allen Inseln vorkommende Art.

SCHIZOTRACHELUS BREVICAUDATUS Lacordaire.

Schizotrachelus brevicaudatus LACORDAIRE, Gen. Col. 7 (1866) 455, nota 2.

LUZON, Provinz Laguna, Los Baños (Sammler unbekannt). NEGROS, Cuernos Mountains (*Baker*). SIBUYAN (*Baker*).

Auf den grossen Sunda-Inseln ebenso häufig wie auf den Philippinen.

SCHIZOTRACHELUS BRUNNEUS Kleine.

Schizotrachelus brunneus KLEINE, Arch. Nat. A. 10, 87 (1921) 36.

LUZON, Provinz Laguna, Los Baños (Sammler unbekannt): Provinz Tayabas, Malinao (*Baker*).

SCHIZOTRACHELUS CONSIMILIS Kleine.

Schizotrachelus consimilis KLEINE, Ent. Blätt. 19 (1923) 166.

LUZON, Provinz Laguna, Los Baños; Manila (Sammler unbekannt). Ich sah die Art auch noch von Amboina.

SCHIZOTRACHELUS CORPULENTUS Kleine.

Schizotrachelus corpulentus KLEINE, Arch. Nat. A. 10, 87 (1921) 32.

MINDANAO, Provinz Agusan, Butuan (*Baker*). Endemische Art.

SCHIZOTRACHELUS IMBRICELLUS Kleine.

Schizotrachelus imbricellus KLEINE, Philip. Journ. Sci. 28 (1925) 604.

LUZON, Provinz Laguna, Mount Banahao (*Baker*). Endemische Art.

SCHIZOTRACHELUS IMITATOR Kleine.

Schizotrachelus imitator KLEINE, Philip. Journ. Sci. 28 (1925) 603, t. 1, fig. 10, 11.

LUZON, Subprovinz Kalinga, Balbalasan (*Boettcher*). LEYTE, Burauen, San Miguel (*Boettcher*). PANAON (*Boettcher*). CAMIGUIN (*Boettcher*). CATANDUANES, Virac (*Boettcher*). Endemische Art.

SCHIZOTRACHELUS INCONSTANS Kleine.

Schizotrachelus inconstans KLEINE, Arch. Nat. A. 10, 87 (1921) 31.

LUZON, Provinz Laguna, Mount Maquiling (*Baker*).

Von den 31 Arten sind nur 8 nicht in der orientalischen Region. Von den 8 Nicht-Orientalen sind 6 auf den Molukken, (einschliesslich Celebes) und nur 2 erreichen Neu-Guinea oder

Australien. Der Habitus der Gattung ist einheitlich, nur in der Figur des Kopfes lassen sich zwei Gruppen erkennen. Diese sind aber nicht zoogeographisch geschieden.

Von den 121 zur Tribus gehörenden Arten sind 33 der æthiopischen, 23 der madegassischen und 43 der orientalischen Region zuzuzählen, 22 sind austro-malayisch beziehungsweise australisch und 1 kommt von Ceylon bis Ost-Australien vor. Die Pseudocossocephalini gehören also nicht dem Verbreitungskreis der Belopherini und Ithystenini. Sie haben ihren Ursprung in Afrika. Die Tribus hat einen intermediären Charakter, die, wahrscheinlich aus den Trachelizini oder mit diesen aus einer noch tieferen Wurzel entstanden, auch als Ausgangspunkt der Nemocephalini anzusehen ist. Aus diesen haben sich die Brenthini entwickelt, vielleicht sind auch die Taphroderini und Ulocerini näher verwandt als man annimmt. Jedenfalls ist der Einfluss auf die Brenthiden der neotropischen Region sehr gross. Nach Osten hin ist der Einfluss geringer gewesen. Man vergleiche hierzu meine Arbeit: "Die geographische Verbreitung der Brenthidæ."*

Gesamt 267 Gattungen mit 1260 Arten. Davon sind im Gebiet: Gesamt 48 Gattungen mit 124 Arten gefunden. Das sind rund 18 Prozent der Gattungen und 9.9 Prozent der Arten. Für ein so kleines Verbreitungsgebiet eine stattliche Anzahl. Von den Gattungen haben nur *Mioliapa* und *Schizotrachelus* einen grösseren Artbestand aufzuweisen. Sieben Tribus kommen überhaupt nicht im Gebiet vor, sie sind mit Ausnahme von Eutrachelini auch nicht in der orientalischen, austromalayischen und australischen Region vertreten.

Bestimmungstabelle der philippinischen Brenthiden.

A. TRIBUS

1. Rüssel in beiden Geschlechtern von gleicher Gestalt ..... 2.
   Prorostrum des ♂ von verschiedener Gestalt, aber niemals fadenförmig. des ♀ immer lang, mehrfach so lang wie das Metarostrum, fadenförmig, zum Bohren eingerichtet ..... 4.
2. Prothorax am Halse verengt, zum Einlegen der Vorderbeine eingerichtet, Elytren am Hinterrand an der Sutura zugespitzt .... Calodromini.
   Prothorax nicht verengt, Elytren nicht zugespitzt ..... 3.
3. Tibien der Vorderbeine mit grossem Innenzahn ..... Stereodermini.
   Tibien ohne Innenzahn ..... Trachelizini.
4. Kopf und Rüssel, oder wenigstens der letztere, deformiert. Amorphocephalini.
   Nicht deformiert .....

* Arch. Nat. A. 10, 87 (1921) 38–132.

TABELLE 9.—*Verbreitungstabelle der Pseudoceocephalini.*

	Ceylon.	Indien.	Bengalen.	Andamanen.	Indo-China.	Malay-Halbinsel.	Sumatra.	Borneo.	Java.	Formosa.	Molukken.	Neu-Guinea.	Australien.
Opisthenoplus calabresii Kleine[a]	—	—	—	—	—	—	—	—	—	—	—	—	—
Opisthenoplus cavus F. Walker	+	+	+	+	+	+	+	+	+	—	—	—	—
Opisthenoplus fascinatus Kleine	—	+	—	—	—	—	+	—	—	+	—	—	—
Opisthenoplus fecundus Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—	—
Opisthenoplus madens Lacordaire	—	—	—	+	+	+	+	—	+	—	—	—	—
Hormocerus reticulatus Fabricius	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Apterorrhinus compressitarsis Senna	—	—	—	—	—	+	+	—	+	—	+	—	—
Apterorrhinus albatus Kleine	—	—	—	—	—	—	—	—	—	—	—	+	+
Schizotrachelus angulaticeps Senna	—	—	—	—	—	+	—	+	—	—	+	—	—
Schizotrachelus bakeri Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—	—
Schizotrachelus brevicaudatus Lacordaire	—	—	—	—	—	—	+	+	+	—	—	—	—
Schizotrachelus brunneus Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—	—
Schizotrachelus consimilis Kleine	—	—	—	—	—	—	—	—	—	—	+	—	—
Schizotrachelus corpulentus Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—	—
Schizotrachelus imbricellus Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—	—
Schizotrachelus imitator Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—	—
Schizotrachelus inconstans Kleine [a]	—	—	—	—	—	—	—	—	—	—	—	—	—

[a] Endemisch. [b] Von Australien bis Ceylon gemein.

5. Fühler vor der Mitte des Rüssels eingefügt, Metatarsus auffallend verlängert ..... Ithystenini.
   Fühler in der Mitte des Rüssels stehend, Metatarsus nicht auffallend verlängert ..... 6.
6. Fühler und Beine lang, Habitus schlank ..... Belopherini.
   Fühler und Beine kurz, Habitus gedrungen ..... 7.
7. Mandibeln das Mannes gross, Rüssel gedrungen ..... Arrhenodini.
   Mandibeln das Mannes klein, Rüssel schlank, mehr oder weniger walzig. Pseudoceocephalini.

B. GATTUNGEN

1. CALODROMINI

1. Tarsen hypermorph, Metatarsus fast so lang wie das ganze Tier. *Calodromus* Guérin.
   Tarsen im Verhältnis zum Körper und den Beinen normal, höchstens der Metatarsus so lang wie das 2. und 3. Glied zusammen ..... 2.

TABELLE 10.—*Stärkenverhältnis der philippinischen Gattungen und Arten zu den Brenthiden der ganzen Welt.*

	Der ganzen Welt.		Davon im Gebiet.	
	Gattungen.	Arten.	Gattungen.	Arten.
Calodromini	62	181	11	26
Stereodermini	8	89	3	15
Trachelizini	27	225	9	36
Amorphocephalini	17	83	3	3
Arrhenodini	41	196	8	10
Belopherini	24	95	6	9
Eutrachelini	1	1	0	0
Tychaeini	1	1	0	0
Ithystenini	21	108	4	8
Ulocerini	2	22	0	0
Pseudoceocephalini	39	124	4	17
Taphroderini	8	32	0	0
Rhyticephalini	1	2	0	0
Nemocephalini	12	62	0	0
Brenthini	3	36	0	0

2. Hinterschienen hypermorph oder doch von auffallender Gestalt, niemals normal ..... 3.
   Hinterschienen normal ..... 4.
3. Auf den Elytren sind alle Rippen gleichmässig entwickelt. *Cyphagogus* Parry.
   Zweite Rippe verkürzt ..... *Epigogus* Kleine.
4. Fühler nach vorn in grossen Gruben stehend, die durch einer mehr oder weniger schmale Wand getrennt sind ..... 5.
   Fühler seitlich stehend, in Rüsselbreite getrennt ..... 6.
5. Auf den Elytren ist die 2. Rippe weit unterbrochen. *Orthopareia* Kleine.
   Die 3., 5. und 7. Rippen vekürzt ..... *Asaphepterum* Kleine.
6. Prothorax vorn gar nicht oder nur ganz wenig verengt ..... 7.
   Prothorax vorn immer zum Einlegen der Beine verengt ..... 9.
7. Unterseite des Kopfes oder Rüssels ohne Zahn oder buckliger Verdickung auf den Seitenkanten ..... *Opisthenoxys* Kleine.
   Unterseite mit mehr oder weniger grossem Zahn oder buckliger Verdickung auf Kopf oder Metarostrum ..... 8.
8. Körper schuppenartig breit behaart ..... *Pseudocyphagogus* Desbr.
   Körper nicht schuppenartig behaart ..... *Mesoderes* Senna.
9. Kopf unterseits nicht gezahnt ..... *Atopomorphus* Kleine.
   Kopf unterseits gezahnt ..... 10.
10. Auf den Elytren sind die 1. und 3. Rippen an der Basis verkürzt, von der 2. und 4. eingeschlossen ..... *Dictyotopterus* Kleine.
    Alle Rippen normal lang ..... *Eterozemus* Senna.

2. STEREODERMINI

1. Fühler sehr lang und dünn, zuweilen von Körperlänge. ***Jonthocerus*** Lacordaire.
   Fühler kurz, gedrungen ..... 2.
2. Neunte bis elfte Fühlerglied verdickt, erheblich grösser als die vorhergehenden ..... ***Stereodermus*** Lacordaire.
   Neunte bis elfte Fühlerglied nicht verdickt, zuweilen kaum so lang wie die vorhergehenden ..... ***Cerobates*** Schoenherr.

3. TRACHELIZINI

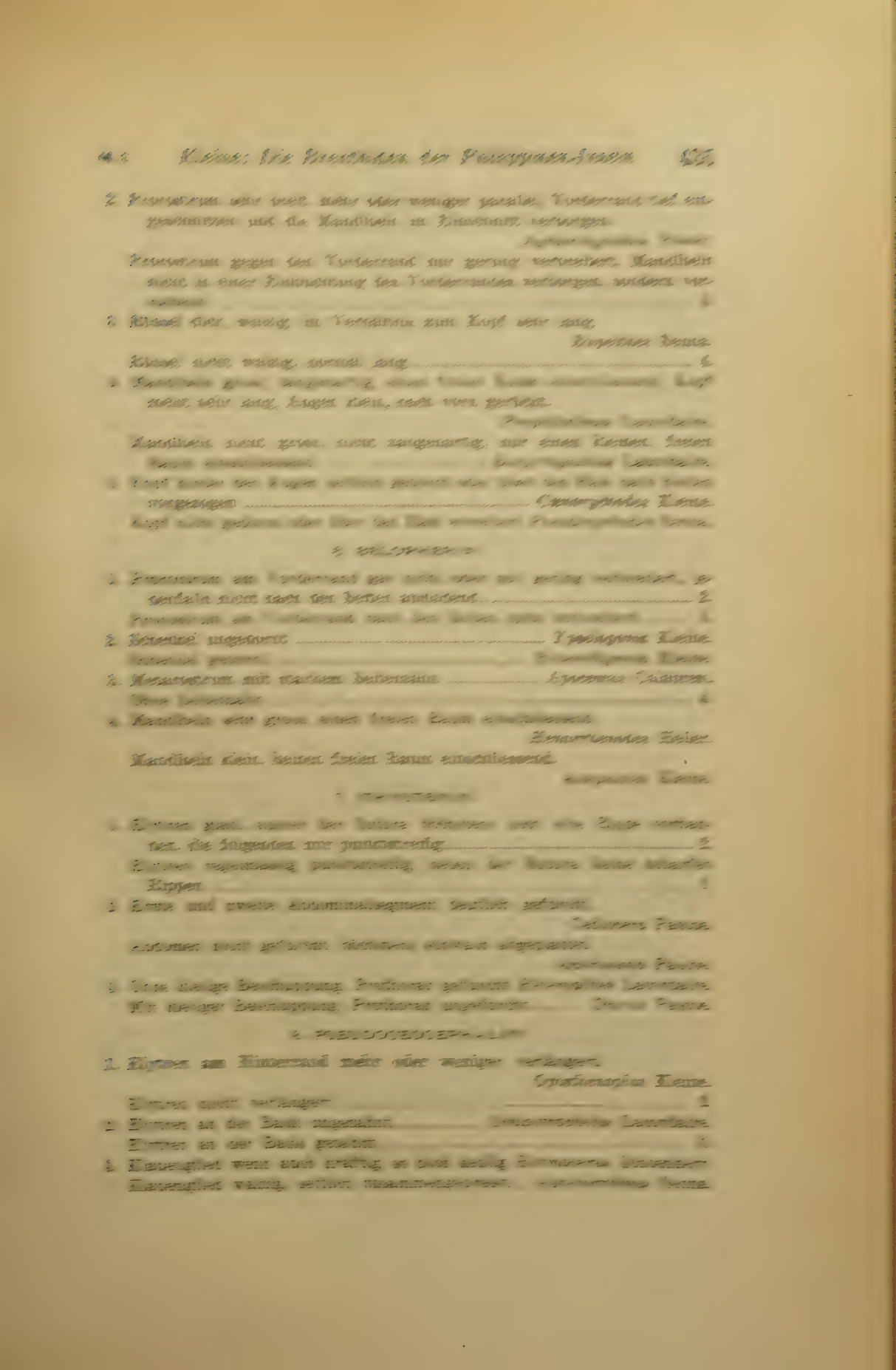
1. Elytren mit erhabenen und tiefliegenden Rippen. Hinterrand an der Sutura verlängert ..... ***Hoplopisthius*** Senna.
   Elytren mit gleichhohen Rippen. Hinterrand gerundet ..... 2.
2. Prothorax ungefurcht ..... 3.
   Prothorax gefurcht ..... 4.
3. Auf den Elytren sind alle Rippen ausgebildet.... *Miolispa* Pascoe (pars).
   Nur die Sutura ist voll entwickelt, die folgenden Rippen fehlen ganz oder sind rudimentär ..... ***Homophylus*** Kleine.
4. Vorderschienen innenseits keilförmig erweitert *Metatrachelizus* Kleine.
   Vorderschienen nicht erweitert ..... 5.
5. Ausser der Sutura sind nur noch eine bis zwei Rippen vorhanden. ***Trachelizus*** Schoenherr.
   Alle Rippen sind entwickelt ..... 6.
6. Kopf oberseits und an den Seiten mehrfach eingekerbt, oder tuberkelartig verdickt ..... 7.
   Kopf nicht eingekerbt, glatt gerundet..... *Microtrachelizus* Senna.
7. Kopf länger als breit. Augen nach vorn gerückt..... *Miolispa* Pascoe.
   Kopf kurz, Augen immer an der Basis stehend ..... 8.
8. Grössere Arten, 10 bis 15 mm.. Schenkel wehrlos *Hypomiolispa* Kleine.
   Kleine Arten, 5 bis 8 mm.. vor der Schenkel gedornt..... *Higonius* Lewis.

4. AMORPHOCEPHALINI

1. Kopf rundlich, nur der Rüssel deformiert..... *Cordus* Schoenherr.
   Kopf und Rüssel deformiert ..... 2.
2. Prorostrum schmaler als das Metarostrum, unterseits glatt, nicht gerinnt ..... ***Leptamorphocephalus*** Kleine.
   Prorostrum breiter als das Metarostrum, unterseits mehr oder weniger vorgezogen oder verdickt ..... ***Paramorphocephalus*** Kleine.

5. ARRHENODINI

1. Rüssel so breit wie der Kopf oder kaum schmaler, robust, Mandibeln immer kräftig, einen freien Raum einschliessend oder nicht..... 2.
   Rüssel schmaler als der Kopf, nach dem Vorderrand erweitert, mit grossen, vorstehenden Mandibeln die einen grossen, freien Raum einschliessen ..... ***Eupsalis*** Lacordaire.
   Rüssel von ähnlicher Gestalt, Mandibeln klein..... 5.
   Rüssel am Vorderrand nicht erweitert, mehr oder weniger parallel, Mandibeln klein bis sehr klein..... ***Amphicordus*** Heller.



C. ARTEN

1. CALODROMINI

Genus CALODROMUS Guérin

Metatarsus mit einem Zahn ..... *C. mellyi* Guérin.
Mit zwei Zähnen ..... *C. crinitus* Kleine.

Genus CYPHAGOGUS Parry

1. Elytren mit 2 rotgelben Binden auf jeder Seite. *C. modiglianii* Senna.
   Elytren einfarbig, schwarz ..... 2.
2. Pro- und Mesorostrum und eine kielförmige Platte auf dem Metarostrum glänzend; Kopf und Rüssel sonst matt ..... 3.
   Kopf und Rüssel gleichmässig glatt ..... 4.
3. Der glänzende Teil des Rüssels zart punktiert; 1. und 2. Abdominalsegment nicht gefurcht ..... *C. planifrons* Kirsch.
   Der glänzende Teil an der Basis grob, rugos punktiert; 1. und 2. Abdominalsegment keilförmig, kraftig gefurcht ..... *C. gladiator* Kleine.
4. Kopf über den Augen mit groben, zuweilen zu einer Furche verschmolzenen Punkten; Kopf grob, einzeln punktiert, in den Punkten behaart ..... 5.
   Kopf ohne Augenfurche, unbehaart, selten mit einzelnen Härchen am Hinterkopf ..... 6.
5. Unterseite des Kopfes mit mehreren Querwülsten. *C. longulus* Senna.
   Ohne Querwülste ..... *C. silvanus* Senna.
6. Metatarsus der Hinterbeine ohne Stiel kürzer als die 2. und 3. Glieder zusammen ..... 7.
   Metatarsus länger als die 2. und 3. zusammen ..... 8.
7. Schlanke Art, Thoracalconus bucklig, Stiel der Hinterschenkel an der Keule unterseits tief, fast halbkreisförmig eingekerbt. *C. westwoodi* Parry.
   Gedrungene Art, Thoracalconus rechwinklig, gerade aufsteigend, Stiel der Hinterschenkel an der Keule nicht eingekerbt. *C. buccatus* Kleine.
8. Stiel der Hinterschenkel gerade, am Uebergang zur Keule nicht verengt oder auf Ober- und Unterseite eingekerbt ..... 9.
   Stiel der Hinterschenkel an der Keule verengt oder eingekerbt ..... 10.
9. Rüssel schmal, viel länger als der Kopf ..... *C. tabacicola* Senna.
   Rüssel nicht auffalend verschmälert, so lang oder kürzer als der Kopf. *C. simulator* Senna.
10. Untere Hälfte der Fühler; Wurzel der Schenkel und die drei letzten Abdominalsegmente rötlich ..... *C. eichhorni* Kirsch.
    Einfarbig schwarz ..... *C. whitei* Westwood.

Genus EPIGOGUS Kleine

Nur eine Art ..... *E. flexibilis* Kleine.

Genus ORTHOPAREIA Kleine

Nur eine Art ..... *O. idonea* Kleine.

Genus **ASAPHEPTERUM** Kleine

Nur eine Art ..... *A. formosanum* Kleine.

Genus **OPISTHENOXYS** Kleine

Fühlerglied am längsten, alle Glieder länger als breit.
O. ochraceus Kleine.
Fühlerglied am längsten, die folgenden Glieder perlig.
O. boettcheri Kleine.

Genus **PSEUDOCYPHAGOGUS** Desbr.

Nur eine Art ..... *P. squamifer* Desbr.

Genus **MESODERES** Senna.

Nur eine Art ..... *M. fessus* Kleine.

Genus **ATOPOMORPHUS** Kleine

Nur eine Art ..... *A. schultzei* Kleine.

Genus **ETEROZEMUS** Senna

Elytren rotbraun, Querbinde schwarz..... *E. pubens* Senna.
Elytren schwarz mit 4 braunen Makeln..... *E. lætus* Senna.

Genus **DICTYOTOPTERUS** Kleine

Zweifarbige Art; Prothorax, Kopf und Rüssel ziegelrot; Elytren blauschwarz; Prothorax unbehaart..... *D. pulcherrimus* Kleine.
Einfarbige Art; Prothorax, namentlich an den Seiten, zottig behaart.
D. philippinensis Kleine.

2. STEREODERMINI

Genus **JONTHOCERUS** Lacordaire

1. Zweite Rippe der Elytren in der Mitte nicht unterbrochen.
J. laticostatis Kleine.
Zweite Rippe mehr oder weniger, meist beträchtlich unterbrochen.... 2.
2. Prothorax ungefurcht, rot gefärbt; Elytren von tiefschwarzer Farbe.
J. bicolor Heller.
Prothorax kräftig gefurcht oder an der Basis tief grubig eingedrückt, das ganze Tier einfarbig..... 3.
3. Kopf hinter den Augen bestimmt winklig..... *J. modiglianii* Senna.
Kopf hinter den Augen gerundet..... *J. asiaticus* Kleine.

Genus **STEREODERMUS** Lacordaire

Nur eine Art ..... *S. flavotibialis* Kleine.

Genus **CEROBATES** Schoenherr

1. Aussenecken der Elytren am Absturz kurz gezahnt.
C. clinatus Kleine.
Aussenecken gerundet ..... 2.
2. Prothorax ungefurcht ..... 3.
Prothorax gefurcht ..... 7.

3. Elytren von der Sutura bis zum Absturz dreifurchig, an den Seiten leicht gestreift oder schwach punktiert; 3. Furche bis zum Absturz verlängert, zuweilen in der Mitte obsolet seltener verschwommen und unsicher ..... 4.
Elytren nur an der Basis dreifurchig, an den Seiten glatt oder leicht gestreift, 3. Furche immer gegen den Absturz verschwindend..... 6.
4. Elytren gegen den Absturz lang, auffällig verschmälert.
C. angustipennis Senna.
Elytren im Apicalteil normal verschmälert..... 5.
5. Prorostrum bestimmt länger als das Metarostrum.... *C. æqualis* Kleine.
Pro- und Metarostrum gleichlang ..... *C. tristriatus* Fabricius.
6. Kleine Art; Rüssel robust; Kopf hinter den Augen gerundet, Seiten der Elytren glänzend ..... *C. sexsulcatus* Motschulsky.
Grosse Art; Rüssel zart; Kopf hinter den Augen mehr oder weniger winklig; Seiten der Elytren gestreift..... *C. adustus* Senna.
7. Kopf oberseits über den Hals zurückgezogen; innen dreieckig eingekerbt.
C. costatus Kleine.
Oberseite des Kopfes gerade oder nur flach nach innen gebuchtet.... 8.
8. Elytren mit durchgehender dritter Furche..... *C. grouvellei* Senna.
Elytren mit verkürzter 3. Furche..... 9.
9. Furche des Prothorax durchgehend, 1. Fühlerglied länglich.
C. sumatranus Senna.
Furche nur in der basalen Hälfte, 11. Fühlerglied kurz.
C. formosanus Schönf.

TRACHELIZINI

Genus HOMOPHYLUS Kleine

Nur eine Art ..... *H. mindanensis* Kleine.

Genus METATRACHELIZUS Kleine

Nur eine Art ..... *M. constans* Kleine.

Genus TRACHELIZUS Schoenherr

Nur eine Art ..... *T. bisulcatus* Fabricius.

Genus MIOLISPA Pascoe

1. Elytren nur auf dem Absturz gerippt-gefurcht, sonst glatt und nur zart punktiert ..... 2.
Elytren auf der ganzen Fläche gerippt-gefurcht..... 3.
2. Einfarbig schwarze Art..... *M. paucicostata* Kleine.
Kopf, Fühler und Rüssel schwarz; Prothorax zinnoberrot; Elytren blaumetallisch ..... *M. pulchella* Kleine.
3. Prothorax deutlich und kräftig längsgefurcht..... 4.
Prothorax ganz obsolet oder ungefurcht..... 6.
4. Prothorax überall dicht und tief grubig punktiert..... 5.
Prothorax höchstens am Hinterrande in sehr geringem Umfange oder gar nicht punktiert ..... *M. fraudatrix* Kleine.
5. Einfarbige matte, schwarze Art, 3. Rippe nicht gelb.
M. unicolor Kleine.
Grünlich-erzfarben, glänzend, 3. Rippe gelb..... *M. persimilis* Kleine.
6. Prothorax mindestens im basalen Teil deutlich und kräftig punktiert 7.
Prothorax unpunktiert, höchstens am Hinterrande mit engen Punkten 17.

7. Prothorax rot; Elytren schwarz ..... 8.
Farbe der Elytren und des Prothorax übereinstimmend oder die Elytren hell und der Prothorax dunkel gefärbt ..... 9.
8. Matte Art, 3. Rippe der Elytren nicht gelb ..... *M. bicolor* Kleine.
Hochglänzende Art, 3. Rippe gelb ..... *M. clavicornis* Kleine.
9. Schenkel der Mittel- und Hinterbeine verdickt, gross, klobig, Stiel kurz, breit, zusammengedrückt ..... 10.
Schenkel normal, keulig, Stiel dünn, deutlich abgesetzt ..... 11.
10. Kopf und Rüssel mit Ausnahme des vorderen Prorostrums matt, Körperseiten dunkel gefärbt ..... *M. flexilis* Kleine.
Am ganzen Körper hochglänzend, Körperseiten hellrotbraun.
M. fornicata Kleine.
11. Schienen aller Beine, namentlich der Vorder- und Hinterbeine mit starkem Innenzahn ..... *M. formosa* Kleine.
Schienen normal ohne Zahn ..... 12.
12. Rotbraune Arten, 3. Rippe gelb oder nicht ..... 13.
Dunkelfarbige Arten, 3. Rippe immer gelb ..... *M. flavolineata* Kleine.
13. Prothorax matt ..... 14.
Prothorax hochglänzend ..... 15.
14. Furche des Metarostrums zu einer sammetartigen, matten Platte vereinigt ..... *M. lineata* Senna.
Nicht sammetartig, nicht vereinigt ..... *M. siporana* Senna.
15. Fühlerglieder eng stehend, 2. Glied breiter als alle anderen.
M. robusta Kleine.
Fühler normal ..... 16.
16. Paramerenlamellen fingerartig, ausser der Sutura eine deutliche schwarze Makel hinter der Elytrenmitte ..... *M. cruciata* Senna.
Paramerenlamellen weit getrennt, zangenartig, nur die Sutura dunkel, Makel meist fehlend, seltener unscharf vorhanden.
M. intermedia Senna.
17. Elytren ausser der Sutura auf der ganzen hinteren Hälfte schwarz.
M. ephippium Kleine.
Elytren rotbraun, höchstens die Sutura and eine oder zwei Makeln verdunkelt 18
18. Nur die Sutura ist dunkel gefärbt ..... *M. pascoei* Kleine.
Ausser der Sutura ist noch eine dunkle Makel vorhanden ..... 19.
19. Mit Ausnahme des 3. sind alle Fühlerglieder breiter als lang.
M. discors Senna.
Mit Ausnahme des 2. sind alle Fühlerglieder länger als breit.
M. elongata Kleine.

Genus HYPOMIOLISPA Kleine

1. Neunte und zehnte Fühlerglied lang, walzig, zylindrisch, mehrfach so lang wie die vorhergehenden, 11. so lang wie das 9. und 10. zusammen ..... 2.
Neunte und zehnte Fühlerglied zwar länger als die vorhergehenden, aber niemals zylindrisch, sondern tonnenförmig, kurz, mehr oder weniger rundlich oder fast quadratisch, 11. meist kurz, zuweilen nur wenig länger als das 8. oder 9 ..... 3.
2. Unterseite vom Prothorax bis zum Abdomen an den Seiten mit silberglänzenden Flecken ..... *H. exarata* Desbr.

Ohne diese Flecken; Kopf, Rüssel und Unterkanten der Schenkel mit starkem Tomment bedeckt, sonst glatt ..... *H. tomentosa* Kleine.

3. Schlanke, kleine Formen, Kopf mehr oder weniger quadratisch-eckig oder etwas länger als breit; Prothorax mit seinen Organen immer schwarz; Elytren niemals quer-schwarzstreifig ..... 4.

Kopf mehr oder weniger robust, zuweilen gedrungen oder grössere Formen mit querem dreieckigem, niemals viereckigem Kopfe; Prothorax nur bei einigen Arten schwarz und dann ist die Grundfarbe überhaupt schwarz; die Elytren sind rot gezeichnet und die Beine sind bunt oder die Elytren sind querstreifig ..... 5.

4. Der hinter den Augen liegende Teil des Kopfes ist doppelt so gross wie der Augendurchmesser, Penis mit kurzen Parameren.
H. nupta Senna.

Der hinter den Augen liegende Teil höchstens so gross wie der Augendurchmesser; Parameren sehr lang ..... *H. sponsa* Kleine.

5. Hinterrand des Kopfes an den Seiten nicht gezahnt, Augen gross, den Hinterrand berührend ..... *H. ocularis* Kleine.

Kopf hinter den Augen gezahnt, die Augen den Hinterrand nicht berührend ..... 6.

6. Prothorax schwarz, Elytren mit 2 schwarzen Querbinden.
H. trachelizoides Senna.

Prothorax rotbraun, Elytren nicht mit schwarzen Bänderungen, sondern mit verdunkelter Sutura und gleichem Aussenrand, zuweilen mit undeutlichen Makel auf der Mitte der Sutura.
H. helleri Kleine.

Genus HIGONIUS Lewis

Nur eine Art ..... *H. cilo* Lewis.

Genus MICROTRACHELIZUS Senna

1. Metarostrum 3-furchig ..... 2.
Metarostrum 1-furchig ..... 3.
2. Kopf oberseits ungefurcht ..... *M. pubescens* Senna.
Kopf oberseits gefurcht ..... *M. tabaci* Senna.
3. Auf den Elytren ist die 2. Rippe nur am Absturz vorhanden, 3. durchgehend, verdickt, 4. und 5. verkürzt, 6. am Absturz verdickt, 7. normal durchgehend, die übrigen fehlen ganz ..... *M. fluxus* Kleine.
4. Rippe nicht unterbrochen, wenn auch verschmälert, keine Rippe ist verkürzt und keine fehlt ..... *M. siamensis* Kleine.

Genus HOPLOPISTHIUS Senna

Nur eine Art ..... *H. trichimerus* Senna.

AMORPHOCEPHALINI

Genus CORDUS Schoenherr

Nur eine Art ..... *C. peguanus* Senna.

Genus LEPTAMORPHOCEPHALUS Kleine

Nur eine Art ..... *L. fœderatus* Kleine.

Genus PARAMORPHOCEPHALUS Kleine

Nur eine Art ..... *P. setosus* Kleine.

ARRHENODINI

Genus AGRIORRHYNCHUS Power

Nur eine Art ..... *A. ignarius* Kleine.

Genus EUPEITHES Senna

Nur eine Art ..... *E. dominator* Kleine.

Genus PROPHTHALMUS Lacordaire

Prothorax mit tiefer Mittelfurche..... *P. longirostris* Gyllenhal.
Prothorax ungefurcht ..... *P. tricolor* Power.

Genus BARYRRHYNCHUS Lacordaire

Nur eine Art ..... *B. schroederi* Kleine.

Genus EUPSALIS Lacordaire

Nur eine Art ..... *E. kleinei* Heller.

Genus CAENORYCHODES Kleine

Schmuckstreifen auf den Elytren lang, 3. Rippe basal bis zur Mitte und mit kurzer Unterbrechung oder durchgehend bis zum Absturz verlängert, 4. wie die 3. oder ähnlich, niemals in kurzen Querbinden. *C. splendens* Kirsch.
Schmuckstreifen nicht lang, sondern in kurzen Querbinden angelegt. *C. serrirostris* Fabricius.

Genus PSEUDORYCHODES Senna

Nur eine Art ..... *P. præclarus* Kleine.

Genus AMPHICORDUS K. M. Heller

Nur eine Art ..... *A. improportionalis* Heller.

BELOPHERINI

Genus YPSELOGONIA Kleine

Nur eine Art ..... *Y. peregrina* Kleine.

Genus HETEROBLYSMIA Kleine

1. Prothorax glatt, ohne rugosem Fleck auf der Mitte. *H. formidolosa* Kleine.
Mit rugosem Fleck ..... 2.
2. Violettbraun, Prothorax ziegelrot, Schmuchzeichnung auf den Elytren längsstreifig ..... *H. electa* Kleine.
Einfarbig braun, Schmuckzeichnung nicht längstreifig. *H. accurata* Kleine.

Genus APOCEMUS Calabresi

Nur eine Art ..... *A. ignobilis* Kleine.

Genus HENARRHENODES K. M. Heller

Nur eine Art ..... *H. macgregori* K. M. Heller.

Genus ECTOCEMUS Pascoe

Nur eine Art ..... *E. badeni* Kirsch.

Genus ANEPSIOTES Kleine

Kopf breiter als lang; Prothorax an den Seiten mit schwarzen Makeln. *A. luzonicus* Calabresi.
Kopf quadratisch; ohne schwarze Makeln..... *A. nitidicollis* Calabresi.

ITHYSTENINI

Genus CEDIOCERA Pascoe

Nur eine Art ..... *C. tristis* Senna.

Genus ACHRIONOTA Pascoe

Am ganzen Körper in der Punktierung schuppig behaart. *A. bilineata* Pascoe.
In den Punkten nicht behaart..... *A. spinifer* Kleine.

Genus HETEROPLITES Lacordaire

Nur eine Art ..... *H. erythroderes* Boheman.

Genus DIURUS Pascoe

1. Basales Fühlerglied höchstens mässig verlängert und an der Spitze niemals nodos verdickt ..... 2.
   Basales Fühlerglied immer lang, schlank, an der Spitze nodos verdickt. 3.
2. Elytren in beiden Geschlechtern nur gedornt, Spitzenglieder der Fühler getrennt ..... *D. shelfordi* Senna.
   Elytren mit deutlichen Anhängen, nicht gedornt, Spitzenglieder der Fühler dich stehend ..... *D. furcillatus* Gyllenhal.
3. Zweite Fühlerglied ⅓ so lang wie das 3..... *D. philippinicus* Senna.
   Zweite und dritte Fühlerglied gleichlang..... *D. samarensis* Kleine.

PSEUDOCEOCEPHALINI

Genus OPISTHENOPLUS Kleine

1. Hinterer Augenrand deutlich gezahnt ..... 2.
   Augenrand ungezahnt oder flach gekerbt..... 4.
2. Augenrand mit 3 Zähnen ..... *O. fascinatus* Kleine.
   Augenrand mit 2 Zähnen ..... 3.
3. Pechbraun; Tarsen der Hinterbeine des ♂ walzig, Prothorax an der Basis kräftig punktiert ..... *O. madens* Lacordaire.
   Rotbraun, Tarsen der Hinterbeine des ♂ kegelig, Prothorax garnicht oder wenig punktiert ..... *O. cavus* F. Walker.
4. Schwarz, Prothorax ziegelrot ..... *O. calabresii* Kleine.
   Einfarbig hellrotbraun ..... *O. fecundus* Kleine.

Genus HORMOCERUS Schoenherr

Nur eine Art ..... *H. reticulatus* Fabricius.

Genus APTERORRHINUS Senna

Schwarz, nur die Tarsen rotbraun, Kopf nicht gefurcht, Suturalfurche gegittert ..... *A. albatus* Kleine.
Rotbraun, Kopf tief gefurcht, Suturalfurche nur punktiert, nicht gegittert ..... *A. compressitarsis* Senna.

Genus SCHIZOTRACHELUS Lacordaire

1. Kopf etwa quadratisch oder wenig länger als breit ..... 2.
   Kopf schmal, viel länger als breit, parallel oder oblong ..... 3.
2. Schwarze Art ..... *S. brevicaudatus* Senna.
   Kirschrote, zuweilen etwas dunklere Art ..... *S. brunneus* Kleine.
3. Zweifarbige Art, Prothorax rot, sonst violettbraun (Nominatform). *S. bakeri* Kleine.
   Einfarbige Arten ..... 4.
4. Pechschwarze Art, Elytren am Hinterrand in der Mitte eingeschnitten. 5.
   Heller oder dunklerbraune Arten ..... 7.
5. Prothorax tief punktiert, Elytren am Absturz mit stark verdickter 8. Rippe ..... *S. imbricellus* Kleine.
   Prothorax unpunktiert oder nur mit einigen zarten Punkten, Elytren nicht mit verdickter 8. Rippe ..... 6.
6. Kopf gegen den Rüssel verengt, Meta- und Prorostrum schmal gefurcht, Hinterschienen breit ..... *S. angulaticeps* Senna.
   Kopf parallel; Metarostrum breit und tief gefurcht; Prorostrum ohne Furche; Hinterschienen schmal ..... *S. imitator* Kleine.
7. Prothorax tief punktiert ..... *S. inconstans* Kleine.
   Prothorax unpunktiert ..... 8.
8. Hinterrand des Kopfes tief dreieckig eingekerbt. *S. bakeri* Kleine f. *concolor*.
   Hinterrand des Kopfes breit, flach eingekerbt ..... 8.
9. Schwarzbraun, Kopf zart punktiert ..... *S. corpulentus* Kleine.
   Rotbraun, Kopf unpunktiert ..... *S. consimilis* Kleine.

ILLUSTRATIONEN

KARTEN

FIG. 1. Verbreitungskarte der Gattung *Calodromus* Guér.
2. Verbreitungskarte der Gattung *Cyphagogus* Parry.
3. Verbreitungskarte der Gattung *Opisthenoxys* Kleine.
4. Verbreitungskarte der Gattung *Mesoderes* Senna.
5. Verbreitungskarte der Gattung *Jonthocerus* Lacord.
6. Verbreitungskarte der Gattung *Stereodermus* Lacord.
7. Verbreitungskarte der Gattung *Cerobates* Schoenherr.
8. Verbreitungskarte der Gattung *Metatrachelizus* Kleine.
9. Verbreitungskarte der Gattung *Miolispa* Pascoe.
10. Verbreitungskarte der Gattung *Microtrachelizus* Senna.
11. Verbreitungskarte der Gattung *Cordus* Schoenh.
12. Verbreitungskarte der Gattung *Baryrrhynchus* Lacord.
13. Verbreitungskarte der Gattung *Eupsalis* Lacord.
14. Verbreitungskarte der Gattung *Caenorychodes* Kleine.
15. Verbreitungskarte der Gattung *Pseudorychodes* Senna.
16. Verbreitungskarte der Gattung *Hormocerus* Schoenh.

NEW OR LITTLE-KNOWN TIPULIDÆ FROM THE PHILIPPINES (DIPTERA), XII [1]

By Charles P. Alexander

Of Amherst, Massachusetts

TWO PLATES

The crane flies discussed in the present report are all from Davao district, Mindanao, Philippine Islands, where they were collected by my friend and former student Mr. Charles F. Clagg. The majority of the specimens were taken at high altitudes on Mount Apo, which was twice ascended to the summit by Mr. Clagg. Other species from this rich collection will be discussed in later parts under this general title. All types are preserved in the author's collection.

LIMONIINÆ

LIMONIINI

LIMONIA (LAOSA) MANOBO sp. nov. Plate 1, fig. 1.

Ground color of notum whitish, the præscutum with four chestnut-brown stripes; femora yellow, the tips broadly blackened; wings whitish, with an irregularly banded yellow pattern, the areas bordered by darker; the supernumerary crossvein in cell R_3 lying far distad of the one in cell R_5.

Male.—Length, about 7.5 millimeters; wing, 9.5.

Rostrum and palpi black, the former about one-half the remainder of the head. Antennæ with the scapal segments black; first flagellar segment light yellow, the remaining segments passing through brown to black; flagellar segments oval, clearly demarked, each with one seta that is a little longer than the segment, unilaterally arranged, in addition to several small setæ; terminal segment one-half longer than the penultimate, the terminal two setæ small. Head brownish gray, the center of the posterior vertex narrowly blackened, the narrow anterior vertex light golden yellow.

[1] Contribution from the entomological laboratory, Massachusetts State College.

Pronotum medially obscure yellow, dark brown sublaterally. Mesonotal præscutum with the restricted ground color whitish, the disk almost covered by four confluent chestnut-brown stripes that are narrowly bordered by blackish, the lateral stripes continued laterad to the margin, leaving a large humeral area of the ground color completely isolated from a small area before the suture; scutal lobes light orange, bordered by blackish, the median area darkened; scutellum yellow, the caudal portion with a large brown spot; postnotal mediotergite chiefly dark brown, the cephalic portion more yellowish, especially medially. Pleura whitish, extensively variegated with dark brown, the major areas including most of the anepisternum and sternopleurite, together with the pleurotergite, and a small spot on the pteropleurite. Halteres black, the base and apex of the stem narrowly and subequally light yellow. Legs with the coxæ pale yellowish white, variegated with brown; trochanters yellow; femora yellow, the tips very broadly blackened, the amount including about the distal quarter and subequal in amount on all legs; tibiæ light yellow; tarsi yellow, the outer segments blackened. Wings (Plate 1, fig. 1) whitish, with an irregularly banded brownish yellow pattern that is suggestive of that of many species of *Epiphragma;* the bands include a restricted postarcular area; a complete band at near midlength of cells R and M, widened out along vein Cu, ending at margin at vein 2d A; bands at cord and outer end of cell 1st M_2, broadly confluent in the stigmal region, the latter extended out across the supernumerary crossveins in the radial field to the margin at midlength and apex of cell R_2; all bands margined with brown; an isolated small brown spot at end of vein 1st A; cells C and Sc uniformly darkened. Venation: Sc_1 ending beyond r-m, Sc_2 close to its tip; R_1 bent strongly caudad at R_2; supernumerary crossvein in cell R_3 lying far more than its own length beyond the one in cell R_5; second section of M_{1+2} strongly sinuous; m-cu about one-half its length beyond the fork of M; cell 2d A wide.

Abdominal tergites dark brown, narrowly pale medially and sublaterally at base; hypopygium chiefly darkened. Male hypopygium almost as in the typical form of the subgenus *Libnotes.*

MINDANAO, Davao district, Mount Apo, Mainit River, altitude 6,500 feet, September 14, 1930 (*C. F. Clagg*); holotype, male.

Limonia (*Laosa*) *manobo* is the second species of *Laosa* to be described and the first record of the subgenus from the Philippines. It is very different from the subgenotype, *gloriosa*

(Edwards), of French Indo-China, in all details of coloration and venation, although the beautifully patterned wings are somewhat alike in the two species. The specific name, *manobo*, is that of a native tribe. It should be noted that the very peculiar structure of the male hypopygium is almost identical with that of the typical form of *Libnotes* and that the same structure has been found in at least one species of the typical subgenus, *Limonia*.

LIMONIA (LIMONIA) BILAN sp. nov. Plate 1, fig. 2.

General coloration of mesonotum obscure yellow, the præscutum with three brown stripes; antennæ black; flagellar segments subglobular, with short yellow apical pedicels; halteres orange; legs obscure yellow, the tips of the femora and tibiæ darkened; wings cream-colored, with a very heavy clouded and spotted pattern; abdomen dark brown.

Female.—Length, about 11 millimeters; wing, 10.5.

Rostrum and palpi black. Antennæ black, the basal flagellar segments subglobular, with abrupt short yellow apical pedicels; penultimate segment short-oval; terminal segment elongate, pointed at apex, about one-third longer than the penultimate; verticils longer than the segments. Head dark gray; anterior vertex (female) a trifle narrower than the diameter of the first scapal segment.

Pronotum dark brown. Mesonotal præscutum obscure yellow, with three brown stripes, the median stripe broad and entire, the lateral stripes narrow and becoming subobsolete on their mesal edges; scutum with the median area gray, the lobes chiefly blackened; scutellum large, pale gray; postnotal mediotergite blackened. Pleura black, variegated with brown on the dorsal and ventral sternopleurite and on the meron; dorsopleural region restrictedly buffy. Halteres orange. Legs with the coxæ black, the apices restrictedly paler; trochanters obscure yellow; femora obscure yellow, the tips deepening to black; trochanters obscure yellow, the tips narrowly blackened; basitarsi black, the proximal ends brown; remainder of tarsi black; claws (female) with a large outer and two progressively smaller, more basal spines. Wings (Plate 1, fig. 2) with the very restricted ground cream-colored, the prearcular and costal ground deeper yellow; a heavy dark brown costal and paler grayish brown discal pattern; the major brown areas are distributed along the costa, those at arculus and at the supernumerary crossvein in cell Sc more extensive; areas at origin of Rs and end

of Sc very narrowly divided by a line of the ground color; stigmal area in oblique alignment with a band along the cord, crossing the base of cell R_3, the area contiguous with a large spot immediately preceding it; numerous grayish brown spots and clouds in all the cells, these confluent to form a pattern that is much more extensive than the ground; veins yellow, darker in the clouded areas. Venation: Sc_1 ending just before midlength of Rs, Sc_2 at its tip; a weak supernumerary crossvein at near midlength of cell Sc; free tip of Sc_2 in alignment with R_2; cell 1st M_2 relatively small; m-cu at or just before the fork of M; anal veins at origin parallel or nearly so.

Abdomen dark brown, the two basal sternites vaguely more yellowish at base, the succeeding two segments with a linear yellow median dash; genital segment obscure fulvous. Ovipositor with the valves reddish horn color; tergal valves slender and acute.

MINDANAO, Davao district, Mount Apo, altitude 8,000 feet, September 19, 1930 (*C. F. Clagg*); holotype, female.

Limonia (*Limonia*) *bilan* is named from one of the native tribes living in the vicinity of Mount Apo. It is quite distinct from the numerous regional species of the subgenus in the abundantly spotted wings, structure of antennæ, and details of coloration.

LIMONIA (LIMONIA) ATROAURATA sp. nov. Plate 1, fig. 3.

General coloration of head and thorax intense orange, the mesonotum with two dark brown lines that extend from the præscutum to the abdomen, converging behind; a narrow black longitudinal stripe on pleura; knobs of halteres darkened; wings dirty whitish, with a heavy brown clouded and spotted pattern; Sc relatively short, Sc_1 ending about opposite one-third the length of Rs; m-cu at near one-third the length of cell 1st M_2.

Female.—Length, about 4.6 millimeters; wing, 5.

Mouth parts very small, black; palpi reduced, black. Antennæ with the scapal segments black; remainder of organ broken. Head fiery orange; anterior vertex very broad, at narrowest point fully three times the diameter of the scape.

Pronotum orange, the anterior notum behind narrowly bordered by black. Mesonotal præscutum intense orange, the usual sublateral stripes represented by brown lines, the broad median area remaining of the ground color; extreme lateral margins of sclerite narrowly and evenly bordered by brownish black, the

lines not quite meeting on the cephalic margin; remaining sclerites of mesonotum orange, traversed by narrow brown lines that converge behind and are direct prolongations of the sublateral præscutal stripes, on the postnotal mediotergite strongly approximated, being divided only by a capillary median line of the ground color. Pleura orange and yellow, with a narrow black longitudinal stripe, extending from the cervical sclerites to the abdomen, the region dorsad of this line more orange, below this line more yellow; a linear black streak at the anterior spiracle. Halteres with the stem obscure yellow, the knobs infuscated. Legs with the coxæ and trochanters yellow; remainder of legs broken, a single one detached, with the specimen and probably belonging here, is almost uniformly blackened, the femora a trifle paler. Wings (Plate 1, fig. 3) dirty whitish, with a heavy brown pattern consisting of very large clouds and washes; the major clouds are at arculus; origin of Rs and tip of Sc; stigma; along cord and outer end of cell 1st M_2; beyond midlength of cells R_2 and R_3; large clouds at ends of anal veins, with an additional major area at midlength of cell 2d A; cells R and M extensively washed with brown; veins pale, darker in the clouded areas. Venation: Sc short, Sc_1 ending at near one-third the length of Rs, Sc_2 close to its tip; Rs relatively short, angulated and spurred at origin; free tip of Sc_2 and R_2 in transverse alignment; cell 1st M_2 rectangular, a little shorter than vein M_{1+2} beyond it; m-cu at one-third the length of cell 1st M_2, subequal to the distal section of Cu_1; anal veins bent rather strongly into the margin, especially 2d A.

Abdominal tergites velvety black laterally, more brownish black medially, the caudal margin medially of each segment with a narrow transverse obscure yellow line, on the basal tergite much more extensive and almost covering the segment; subterminal segments more uniformly brown; genital segment reddish brown; sternites pale brown, the caudal margins narrowly ocherous. Ovipositor with the tergal valves (cerci) small and strongly upcurved; sternal valves (hypovalvæ) longer, straight, blackened at bases.

MINDANAO, Davao district, Mount Apo, Mainit River, altitude 6,500 feet, September 14, 1930 (*C. F. Clagg*); holotype, female.

This beautiful little *Limonia* is very different from any other fly in the Philippine fauna. The short Sc is distinctive of the subgenus *Limonia;* but the distal position of m-cu is a rare condition in this subgenus, being more characteristic of *Libnotes.*

LIMONIA (LIMONIA) BAGOBO sp. nov. Plate 1, fig. 4; Plate 2, fig. 23.

General coloration obscure yellow; front silvery; antennæ, halteres, and legs blackened; basal flagellar segments subglobular, terminal segment elongate; wings with a blackish tinge; cell 1st M_2 open by atrophy of the basal section of M_3; male hypopygium with the dististyle single, at apex produced into an acute blackened spine.

Male.—Length, about 3.5 millimeters; wing, 4.2.

Rostrum and palpi very much reduced, black. Antennæ black throughout; flagellar segments subglobular, the outer ones passing into oval; terminal segment elongate, narrowed outwardly, about one-half longer than the penultimate; verticils short, unilaterally arranged, on outer segments becoming smaller and insignificant. Head brown, the broad frontal region silvery white.

Mesonotum deep yellow, without distinct markings, the pleura paler yellow. Halteres dusky, the knobs blackened. Legs with the coxæ and trochanters yellowish testaceous; remainder of legs black; claws apparently simple or with setæ only. Wings (Plate 1, fig. 4) with a strong blackish suffusion; veins slightly darker. Venation: Sc_1 ending about opposite one-third to two-fifths the length of Rs, Sc_2 at its tip; free tip of Sc_2 some distance before the arcuated R_2; cell 1st M_2 open by the atrophy of the basal section of M_3, cell 2d M_2 a trifle longer than its petiole; m-cu a short distance beyond the fork of M.

Abdomen, including the hypopygium, dark brown. Male hypopygium (Plate 2, fig. 23) with the tergite, 9*t*, elongate, slightly longer than wide, the apex bilobed, provided with long conspicuous setæ. Basistyle, *b*, elongate, the ventromesal lobe slender. Dististyle, *d*, single, oval, narrowed outwardly, at apex produced into an acute blackened spine; on outer face of basal half with a circular pale area provided with a small tubercle bearing two short stout setæ. Gonapophyses, *g*, with the mesal-apical lobe appearing as an acute blackened hook.

MINDANAO, Davao district, Mount Apo, Bakraeyon, altitude 8,000 feet, September 16, 1930 (*C. F. Clagg*); holotype, male.

Limonia (*Limonia*) *bagobo* is named from one of the native tribes inhabiting Mount Apo and surrounding country on the west side of Davao Gulf. The species is very distinct in the venation and structure of the male hypopygium. The peculiar bisetose tubercle on the dististyle of the hypopygium would indicate a relationship with the otherwise very different *L.* (*L.*) *canis* Alexander and *L.* (*L.*) *cynotis* Alexander.

LIMONIA (LIMONIA) SUBPACATA sp. nov. Plate 1, fig. 5; Plate 2, fig. 24.

Male.—Length about 3 millimeters; wing, 3.8.

Female.—Length, about 3.5 millimeters; wing, 4.

Closely related to *L.* (*L.*) *pacata* Alexander and *L.* (*L.*) *prolixicornis* Alexander; differing especially in the venation and structure of the male hypopygium.

Antennæ (male) of moderate length, the flagellar segments short-cylindrical, almost as in *subprolixa* sp. nov. and much shorter than in *prolixicornis*. Head dark.

Thorax light reddish yellow, without distinct markings. Halteres with dusky knobs. Legs chiefly pale testaceous brown, the outer tarsal segments darkened. Wings (Plate 1, fig. 5) grayish subhyaline, the stigma not or scarcely differentiated; veins pale brown. Venation: Sc very short, Sc_1 ending shortly beyond the origin of Rs, with Sc_2 immediately beyond this origin; cell 2d A very narrow.

Abdomen reddish brown, the sternites paler. Male hypopygium (Plate 2, fig. 24) with the lateral lobes of the tergite, 9*t*, pale, glabrous, the caudal margin between the lobes emarginate. Gonapophyses, *g*, with the lateral lobe darkened, the mesal-apical lobe pale, very broad, the apex obtusely rounded.

MINDANAO, Davao district, Mount Apo, Sibulan River, altitude 7,000 to 8,000 feet, September 21, 1930 (*C. F. Clagg*); holotype, male; allotype, female.

The present species differs from all described species of the *pacata* group in the unusually short Sc which extends only a short distance beyond the origin of Rs. The male hypopygium furnishes ready identification characters to separate this fly from *prolixicornis* Alexander and *subprolixa* sp. nov.

LIMONIA (LIMONIA) SUBPROLIXA sp. nov. Plate 1, fig. 6; Plate 2, fig. 25.

Belongs to the *pacata* group; antennæ of male elongate but shorter than in *prolixicornis;* Sc_1 ending beyond midlength of Rs; hypopygium with the tergite terminating in two stout lobes, each bearing five powerful setæ; male hypopygium with the mesal apical lobe of the gonapophyses long and slender.

Male.—Length, about 4 to 4.5 millimeters; wing, 4.5 to 5.5.

Female.—Length, about 5.5 to 6 millimeters; wing, 5.5 to 5.8.

Rostrum and palpi brownish black. Antennæ (male) elongate, but still shorter than in *prolixicornis;* flagellar segments cylindrical, with short apical pedicels. Head dark brownish gray.

Mesonotal præscutum reddish brown, without distinct markings, the posterior sclerites of the notum darker medially.

Pleura yellow, the dorsal pleurites usually darker. Halteres dusky, the knobs infuscated. Legs with the fore coxæ more or less darkened on outer face, the other coxæ and all trochanters yellow; remainder of legs brownish black, the femoral bases restrictedly obscure yellow. Wings (Plate 1, fig. 6) with a brownish tinge, the oval stigma a trifle darker brown; veins dark brown. Venation: Sc_1 ending beyond midlength of Rs, Sc_2 a short distance from its tip; cell M_2 open by the atrophy of m; m-cu at or close to the fork of M.

Abdominal tergites dark brown, the sternites obscure yellow or brownish yellow. Male hypopygium (Plate 2, fig. 25) with the tergal plate, 9*t*, narrow, conspicuous, at apex with two lobes, each bearing about five stout marginal setæ. Basistyles and dististyles almost as in *prolixicornis*. Gonapophyses, *g*, with the mesal-apical lobe long and slender, gently curved, the apex truncated. Ædeagus with unusually wide lateral flanges.

MINDANAO, Davao district, Mount Apo (*C. F. Clagg*); holotype, male, 7,000 to 8,000 feet, September 20, 1930; allotype, female, altitude 8,000 feet, September 19, 1930; paratypes, 15 males and females, 6,500 to 8,000 feet, September 5 to 30, 1930.

Limonia (*Limonia*) *subprolixa* is most closely allied to *L.* (*L.*) *prolixicornis* Alexander, differing in the shorter antennæ of the male and the details of structure of the male hypopygium, especially the tergite and gonapophyses.

HELIUS (HELIUS) PROCERUS sp. nov. Plate 1, fig. 7; Plate 2, fig. 26.

General coloration dark brown; rostrum black, slightly longer than the head; antennæ (male) elongate, if bent backward extending nearly to the base of abdomen; legs black, the tarsi paling to yellow; wings with a faint blackish tinge; anterior branch of Rs strongly arcuated at origin and thence running close to and generally parallel to R_1; cell 1st M_2 long-rectangular, with m-cu shortly beyond its base.

Male.—Length, about 7 millimeters; wing, 7.8.

Female.—Length, about 8 millimeters; wing, 7.2.

Rostrum slightly longer than the remainder of head, black; palpi black. Antennæ (male) unusually elongate for this genus, if bent backward extending nearly to base of abdomen; black throughout; flagellar segments cylindrical, with abundant short dense erect setulæ. Antennæ (female) short, only a little longer than the head. Head black.

Pronotum dark medially, obscure yellow laterally. Mesonotal præscutum dark brown, without distinct markings; me-

dian region of scutum and vicinity of the suture yellow; posterior sclerites of mesonotum darker brown. Pleura dark brown dorsally, more yellowish brown ventrally. Halteres infuscated. Legs with the coxæ brownish testaceous; trochanters yellowish testaceous; remainder of legs blackened, the terminal tarsal segments paling to yellowish. Wings (Plate 1, fig. 7) with a faint blackish tinge, cells C and Sc dark brown, confluent with the scarcely differentiated brown stigma; veins dark brown. Venation: Sc_1 ending some distance beyond r-m, Sc_2 faint or obsolete; r-m on R_{4+5} shortly beyond the fork of Rs; anterior branch of Rs very strongly arcuated at base, at the level of the end of Sc running generally parallel and close to R_1; Rs nearly in alignment with the distal section of R_{4+5}; cell 1st M_2 long-rectangular, shorter than any of the veins beyond it; m-cu a short distance beyond the fork of M.

Abdomen, including the hypopygium, brownish black. Male hypopygium (Plate 2, fig. 26) with the mesal face of basistyle, *b*, at cephalic end with a conspicuous lobe that is covered with abundant spinous setæ. Outer dististyle, *od*, a simple blackened rod, the apex entire. Inner dististyle stout and with conspicuous setæ on basal two-thirds, the apex suddenly narrowed. Gonapophyses, *g*, with the mesal angle a long, slender tail-like spine.

MINDANAO, Davao district, Mount Apo (*C. F. Clagg*); holotype, male, Mainit River, altitude 6,000 feet, September 4, 1930; allotype, female, Galog River, attracted to camp fire, altitude 6,000 feet, September 22, 1930; paratype, a fragmentary specimen, altitude 7,000 feet, September 11, 1930.

Helius (*Helius*) *procerus* is most closely allied to *H.* (*H.*) *arcuarius* Alexander (Luzon), differing most evidently in the large size and elongate antennæ of the male sex.

HELIUS (HELIUS) APOENSIS sp. nov. Plate 1, fig. 8.

General coloration pale yellow ocherous, without markings; head blackish gray; wings ocher brown, the stigma a little darker; wings with cell R_1 closed by the apical fusion of veins R_{1+2} and R_3.

Male.—Length, about 3 millimeters; wing, 3.5 to 3.6.

Rostrum and palpi black. Antennæ black throughout. Head blackish gray.

Pronotum brown. Mesothorax light yellow ocherous, unmarked, the scutellum a little paler. Halteres pale, the knobs slightly darkened. Legs with the coxæ and trochanters yellowish testaceous; remainder of legs pale brownish yellow, the ter-

minal tarsal segments brighter yellow. Wings (Plate 1, fig. 8) pale ocher brown, the pale stigma only slightly indicated; veins pale brown. Costal fringe (male) conspicuous. Venation: Almost as in *trianguliferus;* anterior branch of Rs shorter and more erect at origin, the fusion with R_{1+2} slightly longer.

Abdomen pale brownish yellow.

MINDANAO, Davao district, Mount Apo, altitude 7,000 feet, September 11, 1930 (*C. F. Clagg*); holotype, male; paratype, male.

Very similar and closely related to *Helius* (*Helius*) *trianguliferus* Alexander (Luzon-Mindanao), differing especially in the light ocher-yellow coloration of the body.

THAUMASTOPTERA (THAUMASTOPTERA) MACULIVENA sp. nov. Plate 1, fig. 9; Plate 2, fig. 27.

General coloration pale yellow; antennal scape black, the flagellum yellow; knobs of halteres weakly infuscated; legs pale yellow, the genua very restrictedly to scarcely darkened; wings grayish white with a conspicuous brown and gray pattern that appears as seams to the veins; Sc relatively short; r-m shortened by approximation of the adjoining veins; male hypopygium with the dististyle slender, its tip pointed.

Male.—Length, about 2.5 millimeters; wing, 3.5.

Rostrum brownish black; palpi black. Antennæ with the scape black, the flagellum abruptly light yellow; flagellar segments subglobular to short-oval, with long conspicuous verticils that much exceed the segments. Head brown.

Mesonotum pale yellow, in cases the postnotal mediotergite a trifle darker. Pleura pale yellow. Halteres pale, the knobs weakly infuscated. Legs with the coxæ and trochanters pale yellow; remainder of legs pale yellowish white, the genua very restrictedly to almost insensibly darkened. Wings (Plate 1, fig. 9) with the ground color grayish white, the prearcular and costal regions clearer cream yellow; a restricted brown and gray pattern appearing as seams along the veins, arranged as follows: Arculus, including the surrounding veins; origin of Rs and opposite portion of costa; cord; ends of longitudinal veins from M_{1+2} to anal veins, inclusive; a cloud on costa at near three-fourths the length of cell R_2; at midlength of vein R_{4+5}; m and adjoining parts of M_{1+2} and M_3; m-cu; at near midlength of basal section of Cu_1; a second dash on vein 2d A on basal half; a weak axillary darkening; veins pale yellow, brown in the clouded areas. Costal fringe relatively long. Venation: Sc of mod-

erate length, Sc_1 ending about opposite one-third the length of Rs, Sc_2 some distance from its tip, opposite or close to origin of Rs, the latter angulated and long- or short-spurred at origin; r-m short, reduced by approximation of adjoining veins.

Abdomen yellow, including the hypopygium. Male hypopygium (Plate 2, fig. 27) with the dististyle, *d*, slender, pale, terminating in an acute pale spinous point, with one long pale seta on outer margin before apex, together with a row of four black setæ on inner margin, distributed over the outer half; additional setæ on inner face at base. Ædeagus, *a*, short.

MINDANAO, Davao district, Mount Apo, Galog River, altitude 6,000 feet, September 26, 1930; Mainit River, altitude 6,000 to 6,500 feet, September 6 to 14, 1930 (*C. F. Clagg*); holotype, male; paratypes, 3 males.

It should be noted that this is the first record of the typical subgenus of *Thaumastoptera* in the eastern Asiatic area, the only other member of the genus so far discovered in Asia being *Thaumastoptera* (*Taiwanita*) *issikiana* Alexander, from the high mountains of Formosa. The present species is very distinct from the genotype, *calceata* Mik, in the wing pattern.

HEXATOMINI

ADELPHOMYIA APOANA sp. nov. Plate 1, fig. 10.

General coloration dark brown; antennæ 16-segmented, dark throughout; wings with a faint brown tinge, with a restricted darker brown pattern, including the stigma and narrow seams at origin of Rs and along cord; macrotrichia of membrane relatively sparse.

Female.—Length, about 4 millimeters; wing, 4.3.

Rostrum and palpi black. Antennæ black, the flagellar segments somewhat paler; sixteen distinct segments, the basal ones shorter and more crowded; outer segments long-cylindrical, with long verticils that exceed the segments; terminal segment about one-half longer than the penultimate. Head dark brown.

Thorax almost uniform brown, the central portion of the præscutum darker. Pleura a trifle more testaceous brown than the notum. Halteres elongate, dusky, the base of the stem restrictedly pale. Legs with the coxæ and trochanters yellowish testaceous; remainder of legs brown, with long outspreading setæ. Wings (Plate 1, fig. 10) with a faint brown tinge, with a very restricted, slightly darker brown pattern, including the stigma and narrow seams at origin of Rs and along the cord;

veins pale brown. Macrotrichia of cells relatively sparse, in the outer ends of cells R_2 to M_3, inclusive. Venation: Sc_1 ending shortly before the fork of Rs, Sc_2 some distance from its tip; Rs weakly angulated at origin; m-cu at near midlength of lower face of cell 1st M_2; cell M_1 present.

Abdomen brownish black. Ovipositor with the elongate tergal valves darkened at bases, the slightly upcurved acute tips yellow.

MINDANAO, Davao district, Mount Apo, Kidopawan trail to Lake Lino, altitude 7,000 to 8,000 feet, September 20, 1930 (*C. F. Clagg*); holotype, female.

Adelphomyia apoana is apparently distinct from any of the now rather numerous regional species in the wing pattern, venation, and conformation, and in the relatively sparse macrotrichia of the membrane. The nearest ally seems to be *A. carbonicolor* Alexander.

ADELPHOMYIA PAUCISETOSA sp. nov. Plate 1, fig. 11; Plate 2, fig. 28.

General coloration black; antennæ 15-segmented, the fusion segment yellow, remainder of organ darkened; wings milk white with a heavy brown pattern that is distributed chiefly as narrow broken crossbands; macrotrichia of membrane very sparse, being restricted to a few trichia in ends of cells R_3 and R_4; male hypopygium with the outer dististyle bearing a long erect spine on inner face at near midlength.

Male.—Length, about 3 millimeters; wing, 3.8.

Rostrum and palpi brownish black. Antennæ with the scape black, the fusion segment pale yellow; remainder of flagellum brown; antennæ with fifteen segments, the short-conical fusion segment involving two segments; outer flagellar segments subcylindrical, with verticils that exceed the segments in length; terminal segment about one-fourth longer than the penultimate. Head black.

Pronotum obscure brownish yellow medially, blackened laterally. Mesonotal præscutum yellowish brown to chestnut, darker medially; scutal lobes light brown; posterior sclerites of mesonotum dark brown. Pleura black. Halteres chiefly pale yellow, the central portion of stem vaguely darker. Legs with the fore coxæ brownish yellow, the remaining coxæ black; trochanters testaceous; remainder of legs brown, the outer tarsal segments somewhat darker; no tibial spurs; segments of legs with long conspicuous setæ. Wings (Plate 1, fig. 11) milky white, with a heavy brown pattern that is arranged chiefly as six or

seven, narrow, broken crossbands, interrupted at the central portion of the disk; basal band beyond arculus, complete; second band at origin of Rs and end of vein 2d A, broken in cells M and Cu; third band at Sc_2 and end of 1st A, interrupted but replaced in a slightly more distal position by a similar seam along cord; an interrupted irregular band includes the stigma, outer end of cells 1st M_2 and M_4; an outer band includes end of R_3, and a prolongation of the area across cells R_5 and 2d M_2; additional brown clouds at ends of veins R_4 and R_5; paler washes in cells M, Cu, and at midlength of cell 2d A; veins pale, darker in the clouded areas. Macrotrichia of cells very sparse, being restricted to a group of five or six in outer end of cell R_4, with one or two more in cell R_3. Venation: Sc_1 ending about opposite the end of Rs; veins R_3 and R_4 slightly upcurved at ends; R_2 at fork of R_{3+4}; cell M_1 present; cell 1st M_2 strongly narrowed at proximal end, r-m being correspondingly lengthened, arcuated.

Abdomen chiefly black, including the hypopygium. Male hypopygium (Plate 2, fig. 28) with the outer dististyle, *od*, an elongate-oval blackened structure, terminating in two slender spines, one being slightly more curved; just beyond midlength of style on inner margin a long slender erect spine. Inner dististyle, *id*, very stout at base, the obtuse tip narrowed.

MINDANAO, Davao district, Mount Apo, Mainit River, altitude 6,000 feet, September 22, 1930 (*C. F. Clagg*); holotype, male.

Adelphomyia paucisetosa most closely resembles *A. nebulosa* (de Meijere), of western Java, differing from all known species in the very notable reduction in number of macrotrichia of the wings, a condition which presages their total loss.

EPIPHRAGMA (POLYPHRAGMA) FUSCOFASCIATA sp. nov. Plate 1, fig. 12.

General coloration of mesonotum ocherous brown, dark brown laterally; pleura and pleurotergite black; antennal scape and fusion segment of antenna pale; halteres black; wings yellow, with three more or less complete crossbands of brownish black, the third band at the cord, very broad but more or less interrupted by pale; wing tip pale, with small dark spots at ends of the veins.

Female.—Length, about 7 millimeters; wing, 7.5.

Rostrum yellowish gray; palpi black. Antennæ with the first scapal segment light brown; second segment obscure yellow; fusion segment bright orange; remainder of flagellum black. Head yellowish gray, the central and posterior portions of the vertex darker.

Pronotum obscure yellow, deepening to black on sides. Mesonotal præscutum ocher brown sublaterally, darker brown medially, the lateral margins narrowly and abruptly dark brown; scutal lobes dark brown; scutellum black, the parascutella somewhat paler; postnotal mediotergite obscure yellowish brown, blackened posteriorly. Pleura and pleurotergite black. Halteres black. Legs with the fore coxæ dark brown, the remaining coxæ black; trochanters brownish yellow; femora yellow, darkened subterminally; remainder of legs yellow. Wings (Plate 1, fig. 12) with the ground color yellow, with three heavy crossbands of brown to brownish black; basal area including the arcular region; second band at origin of Rs; third band very broad, extending from before the cord to the level of R_3, interrupted by a few small yellow areas, as in cells Sc_2, R_2, 1st M_2, M_3, and M_4; wing apex pale, varied by a series of marginal brown areas at ends of veins R_4 to M_2, inclusive; the yellow alternating crossbands are slightly clouded with dusky in the cubital and anal fields, leaving clear yellow margins bordering the crossbands; veins yellow, dark in the infuscated areas. In the paratypes, the outer band is more extensively interrupted by pale markings. Venation: Crossveins and spurs in cell C very much restricted in number; Rs square and weakly spurred at origin; cell 1st M_2 relatively small.

Abdomen rather light brown, the caudal margins of the segments narrowly but conspicuously brownish black; genital segment obscure yellow; valves of ovipositor horn-colored, the bases of the cerci darker.

MINDANAO, Davao district, Mount Apo (*C. F. Clagg*); holotype, female, Galog River, altitude 5,000 to 6,000 feet, September 12, 1930; paratypes, two females, Sibulan River, altitude 7,000 to 8,000 feet, September 21, 1930; one female, Kidopawan trail from Lake Lino, altitude 7,000 to 8,000 feet, September 20, 1930.

Epiphragma (*Polyphragma*) *fuscofasciata* is distinguished from other members of the *ochrinota* group by the handsomely banded wing pattern.

EPIPHRAGMA (POLYPHRAGMA) LATITERGATA sp. nov. Plate 2, fig. 29.

General coloration of mesonotum brownish yellow, contrasting with the blackened pleura; legs yellow, the femora with a broad pale yellow subterminal ring; wings with the ground color light brown, with a heavier brown pattern that is narrowly margined with light yellow; male hypopygium with the lateral lobes of the tergite broad, obtuse; interbasal process at apex expanded

at apex into a truncated blade, the outer apical angle bearing a small, curved, beaklike spine.

Male.—Length, about 7.5 to 8 millimeters; wing, 8 to 9.

Female.—Length, about 9 to 10 millimeters; wing, 9 to 9.5.

Rostrum and palpi dark brown. Antennæ with the first scapal segment blackened, the second obscure brownish yellow; basal flagellar segments not distinctly united into a fusion segment, beyond the base black, the verticils exceeding the segments in length. Head dull yellowish gray, the posterior vertex more reddish brown, the caudal portions more infuscated on either side of the midline.

Mesonotum dull brownish yellow, without markings, the lateral portions of the præscutum deep chestnut orange. Pleura blackened, as in the group, the ventral sternopleurite remaining yellowish. Halteres yellow, the knobs dark brown. Legs with the coxæ obscure yellow, narrowly darkened basally, especially the posterior coxæ; trochanters yellow; femora yellow, with a broad pale brown subterminal ring; remainder of legs light yellow, the terminal tarsal segments passing into fulvous. Wings with the ground color light brown with a heavier brown pattern, arranged as in the group, the major areas being at arculus; origin of Rs; along cord and outer end of cell 1st M_2; fork of M_{1+2}; and as conspicuous circular marginal clouds at ends of all longitudinal veins; the dark pattern is narrowly but conspicuously bordered by pale yellow; costal margin yellow, beyond the region of the stigma appearing as three isolated spots in outer ends of cells R_2, R_3, and R_4; veins dark, obscure yellow in the costal interspaces. No dilation of the axillary region. Venation: Spurs and supernumerary crossveins in cell C six to eight in number, all seamed by darker; Rs relatively long, angulated and weakly spurred at origin; m-cu variable in position, at one-fourth to midlength of cell 1st M_2.

Abdomen chiefly dark brown, including the sternites and hypopygium. Male hypopygium (Plate 2, fig. 29) generally as in *fulvinota* but differing in some important regards, notably the broad, obtuse lobes of the tergite, 9*t*, and the shape of the interbasal processes, *i*. These latter normally are expanded at apex into a squarely truncated blade that bears on outer apical angle a small, curved hooklike spine.

MINDANAO, Davao district, Mount Apo, altitude 5,000 to 8,000 feet, August 31 to September 21, 1930 (*C. F. Clagg*); holotype, male; allotype, female; paratopotypes, several of both sexes.

Among the species of the *ochrinota* group, the present fly is closest to *Epiphragma* (*Polyphragma*) *fulvinota* Alexander, from which it differs most evidently in the wing pattern, with conspicuous narrow yellow margins to the darkened areas, the paler brown femoral annuli, and the structure of the male hypopygium, notably of the tergite and interbasal processes.

EPIPHRAGMA (POLYPHRAGMA) NIGROTIBIATA sp. nov. Plate 1, fig. 13; Plate 2, fig. 30.

General coloration of mesonotum yellow, variegated with dark brown; pleura yellow, with scattered small dark brown spots; femora yellow basally, the distal half black, inclosing two narrow yellow rings; tibiæ black; tarsi yellow; wings brownish yellow, the cephalic portion deeper yellow, the surface with a heavy brown pattern.

Male.—Length, about 7.5 millimeters; wing, 8.5.

Rostrum and palpi black. Antennæ relatively short; scapal segments brown, the fusion segment and second segment of flagellum orange; remainder of flagellum black; verticils exceeding the segments in length. Head brownish gray, the lateral portions of the vertex and the genæ more reddish brown.

Pronotum yellow, the anterior notum variegated with dark brown on the sides. Mesonotal præscutum yellow, variegated with dark brown medially, the area broad and entire behind, becoming bifid and obsolete in front; sublateral portions of the sclerite deeper reddish yellow than the pollinose interspaces; extreme lateral margins of præscutum dark brown; scutal lobes reddish brown, margined with slightly darker brown, the cephalic lateral portions brighter; scutellum brown; postnotal mediotergite dark brown, pruinose. Pleura yellow, variegated with scattered brown areas, located on the dorsal anepisternum, dorsal sternopleurite, ventral sternopleurite, meron, and dorsal and ventral pleurotergite. Halteres dark brown, the base of the stem light yellow. Legs with the coxæ and trochanters yellow, the posterior coxæ a little darker apically; femora yellow basally, the outer half passing into black, inclosing a narrow apical and a slightly wider subapical yellow ring; tibiæ black, the extreme base yellow; tarsi light yellow, the terminal segments darkened. Wings (Plate 1, fig. 13) brownish yellow, the prearcular, costal, and radial fields deeper yellow; a heavy brown pattern, distributed as follows: A series of narrow costal and subcostal areas surrounding the crossveins and spurs in the former cell; larger areas at arculus; origin of Rs; along cord; outer end of cell 1st

M_2; fork of M_{1+2}; marginal clouds at ends of all longitudinal veins, largest on the anals; a restricted dark area in axillary region; radial and medial cells beyond the level of the fork of M_{1+2} extensively darkened, confluent with the marginal dark areas in this field to produce a radiate appearance; dark areas behind the costa narrowly bordered by cream yellow; veins pale brown, darker in the infuscated areas. Venation: A series of supernumerary crossveins and spurs in cell C; m-cu more than one-half its length beyond the fork of M; supernumerary crossvein in cell Cu atrophied or nearly so.

Abdominal tergites dark brown, the basal ring of the second segment obscure yellow laterally; impressed transverse lines of the remaining tergites narrowly bordered by pale; sternites obscure yellow, the extreme caudal margins of the segments darkened. Male hypopygium (Plate 2, fig. 30) with the interbasal process, *i*, a slender rod from a dilated base, the apex weakly expanded and further produced into a small curved point. Outer dististyle, *od*, dilated at midlength, the apex a strongly curved spine.

MINDANAO, Davao district, Mount Apo, Mainit River, altitude 6,500 feet, September 14, 1930 (*C. F. Clagg*); holotype, male.

Epiphragma (*Polyphragma*) *nigrotibiata* is well-distinguished by the uniformly black tibiæ and the pattern of the femora.

EPIPHRAGMA (POLYPHRAGMA) APOENSIS sp. nov. Plate 1, fig. 14; Plate 2, fig. 31.

General coloration of mesonotum yellow, the disk with three confluent brown stripes; pleura chiefly yellow, margined with brownish black; femora yellow with a broad black subterminal ring; wings pale brown, with a heavy dark brown pattern that is narrowly bordered by cream yellow; male hypopygium with the lateral lobes of the tergite broad; interbasal process a simple blade terminating in a small beak.

Male.—Length, about 7.5 millimeters; wing, 8.5.

Rostrum brown; palpi black. Antennæ with the scape light brown; fusion segment small, yellow; remainder of flagellum black; basal flagellar segments short-oval, the outer segments subcylindrical, with verticils that are about as long as the segments. Head above with the central area dark brown, paling to reddish on sides of posterior vertex.

Pronotum yellow, dark brown laterally. Mesonotal præscutum yellow, the extreme lateral margin dark brown; disk of præscutum almost covered by three confluent brown stripes that are further divided by a capillary dark brown vitta; scutal lobes

brown, the extreme cephalic-lateral angles brightened; posterior sclerites of mesonotum yellowish brown, the postnotal mediotergite darker medially. Pleura chiefly yellow, variegated with brownish black on the margins, including the dorsopleural membrane, cephalic and ventral margin of sternopleurite, meron and dorsal and ventral portions of pleurotergite. Halteres long, pale yellow, the knobs infuscated. Legs with the coxæ and trochanters yellow; only a single (hind) leg remains; femora yellow, brighter yellow on distal fourth, this area inclosing a broad black ring; tibiæ and tarsi yellow. Wings (Plate 1, fig. 14) with the ground color pale brown, with a heavy dark brown pattern that is bordered by narrow cream-yellow margins; costal brown pattern including both cells C and Sc, with three costal areas passing into a large solid marking at origin of Rs; an hourglass-shaped darkening at the cord; wing apex beyond cell 1st M_2 chiefly darkened, variegated by yellow marginal areas in the outer ends of cells R_3, R_4, M_1, and 2d M_2, together with small paler yellow spots in bases of cells M_1, 2d M_2, and M_3; a large darkened mark at end of vein 2d A, extending to Cu; axilla darkened; a large area at arculus; veins pale yellow in the ground, darker in the clouded portions. Venation: Costal spurs and crossveins numerous, including about four beyond the origin of Rs, the latter angulated and spurred at origin; m-cu about one-half its length beyond the fork of M.

Abdominal tergites dark brown, the basal ring brighter, especially laterally; sternites extensively yellowish, the caudal margins darkened; hypopygium chiefly darkened. Male hypopygium (Plate 2, fig. 31) with the lateral lobes of the ninth tergite, 9*t*, broad, separated by a deep notch. Interbasal process, *i*, a relatively narrow blade, the apex a small curved beak. Outer dististyle, *od*, with the main body spinous on outer margin, the apex a long curved spine.

MINDANAO, Davao district, Mount Apo, Seliban River, altitude 7,000 feet, September 11, 1930 (*C. F. Clagg*); holotype, male.

Belongs to the *fuscosternata* group, having the mesonotum and pleura conspicuously variegated yellow and brown. The type of hypopygium is much like that of *E.* (*P.*) *fulvinota* that belongs to the *ochrinota* group, the resemblance being especially striking in the general features of the interbasal process and dististyles.

EPIPHRAGMA (POLYPHRAGMA) HASTATA sp. nov. Plate 2, fig. 32.

General coloration of mesonotal præscutum dark brown, margined with yellow; pleura yellow, variegated with dark brown; femora yellow, with a broad subterminal dark brown to

brownish black ring; wings with a heavy dark brown pattern that is bordered by cream yellow; male hypopygium with the lobes of the ninth tergite broad, microscopically roughened at apices; interbasal rod an acute spearlike point.

Male.—Length, about 9 millimeters; wing, 10.

Rostrum light brown; palpi dark brown. Antennæ with the scape brownish yellow; basal three flagellar segments light yellow, the remainder passing into dark brown; no distinctly developed fusion segment. Head orange, the center of the vertex infuscated.

Pronotum yellow. Mesonotal præscutum yellow laterally, margined narrowly with dark brown; disk almost covered by three confluent dark brown stripes, the region of the interspaces more yellowish pollinose; scutal lobes dark brown; median area of scutum and the scutellum pale, yellowish pollinose; postnotal mediotergite brown, with a more yellow pollinose area on either side at midlength. Pleura yellow pollinose, variegated with dark brown, including the anterior dorsopleural region, the anterior margin of the anepisternum and sternopleurite, the meron, and the dorsal and ventral pleurotergite. Halteres pale yellow, the knobs infuscated. Legs with the coxæ and trochanters orange yellow, the posterior coxæ and cephalic face of the fore coxæ darkened; femora yellow, with a very broad dark brown (fore femora) to brownish black (posterior femora) subterminal ring; remainder of legs yellow. Wings with the ground color pale brown, with a heavy dark brown pattern; prearcular and costal portions deeper yellow; brown areas bordered by creamy margins; dark markings in cells C and Sc numerous; major dark areas arranged as follows: Arculus; origin of Rs, with a more-elongate area in alignment at the supernumerary crossvein in cell Cu and end of vein 2d A, interrupted at cell M; along cord, narrowed in the medial field; outer end of cell 1st M_2; ends of all longitudinal veins, continued back along the veins; veins light brown, darker in the infuscated areas, more yellow in the flavous interspaces.

Abdominal tergites chiefly dark brown, the basal rings paler; sternites more yellowish, the incisures narrowly darkened; hypopygium with the basistyles pale. Male hypopygium (Plate 2, fig. 32) with the lateral lobes of the tergite, 9*t*, broad, microscopically roughened at apices, separated by a deep U-shaped notch. Interbasal process, *i*, an acute spearlike rod. Outer dististyle, *od*, terminating in an acute curved spine.

MINDANAO, Davao district, Mount Apo (*C. F. Clagg*); holotype, male, altitude 6,000 feet, August 30, 1930; allotype, female, altitude 7,000 feet, September 11, 1930.

Epiphragma (*Polyphragma*) *hastata* belongs to the *fuscosternata* group, being most closely allied to *E.* (*P.*) *fuscosternata* Alexander and *E.* (*P.*) *apoensis* sp. nov. It differs from the latter in the distinctive structure of the male hypopygium and from the former (the male of which is still unknown) in the more-restricted amount of dark coloring in the anal cells of the wing.

EPIPHRAGMA (POLYPHRAGMA) CANINOTA sp. nov. Plate 1, fig. 15; Plate 2, fig. 33.

General coloration of dorsum of head and mesonotum light ashy gray; knobs of halteres infuscated; legs yellow; wings of both sexes with a conspicuous axillary crenulation; radial cells clouded with brown; darkened areas of wing not bordered by paler.

Male.—Length, about 6.5 millimeters; wing, 7.5.

Female.—Length, about 8.5 millimeters; wing, 8.2.

Rostrum reduced, pale brown. Antennæ with the scape and fusion segment pale yellow, the remainder of the flagellum black. Head above light ashy gray, the posterior slope of the vertex, together with the genæ, more orange yellow, infuscated medially.

Mesonotum above light ashy gray on the dorsomedian portion, the sides of the præscutum and postnotal mediotergite abruptly orange yellow. Pleura yellow. Halteres yellow, the knobs infuscated. Legs yellow, the terminal tarsal segments darkened. Wings (Plate 1, fig. 15) yellowish brown, the costal margin light yellow, continued to the wing tip in the radial field but here broken into spots by brown clouds at the ends of the veins; radial field extensively suffused with brown; additional brown clouds and spots at arculus; origin of Rs; cord; outer end of cell 1st M_2; fork of M_{1+2}; at supernumerary crossveins in cells C and Cu, and as large marginal clouds at ends of the veins; veins brownish yellow, darker in the clouded areas. Axillary crenulation large and conspicuous, a trifle less developed in female than in male. Venation: Supernumerary crossvein in cell Cu well-preserved in both sexes; m-cu in male at fork of M, in female, beyond the fork but with the crossvein in transverse alignment with the other elements of the cord.

Abdominal tergites yellowish brown, darker laterally; sternites clearer yellow. Male hypopygium (Plate 2, fig. 33) with

the apex of the interbasal process, *i*, a tonglike structure, the lateral arm being a curved spine. Outer dististyle relatively slender, the vestiture of outer face consisting of abundant delicate setulæ, with a few longer setæ. Inner dististyle with apex dilated into a slight head, bearing one unusually long seta.

MINDANAO, Davao district, Mount Apo, Galog River, altitude 6,000 feet, September 8, 1930 (*C. F. Clagg*); holotype, male; allotype, female, in copula.

There is a considerable group of species of *Polyphragma* in the Philippines having the head and mesonotum chiefly clear ashy gray, differing from one another by distinctions in the degree of development of the axillary lobe, the wing pattern, and slight details of structure of the male hypopygium. I have called this group of flies the *crenulata* group. The present fly falls in this division and seems closest to *E.* (*P.*) *cinereinota* Alexander; which differs in the coloration of wing and body, as the blackened subterminal ring of the abdomen.

EPIPHRAGMA (POLYPHRAGMA) GRISEICAPILLA sp. nov. Plate 1, fig. 16; Plate 2, fig. 34.

Belongs to the *crenulata* group; general coloration of dorsum of head and mesonotum light ashy gray; antennal scape dark brown, the flagellar fusion segment light yellow; wings with the ground color brownish yellow, the costal region clearer yellow; a heavy brown pattern that is narrowly bordered by clear yellow; male hypopygium with the apex of the interbasal process expanded, the notch small, the lobes broadly flattened.

Male.—Length, about 7 millimeters; wing, 7.5.

Rostrum and palpi black. Antennæ with the scapal segments dark brown, sparsely pruinose; fusion segment yellow; remainder of flagellum black; verticils longer than the segments. Head light gray in front, behind and on sides more brownish, the center of the posterior vertex brownish black.

Mesonotum clear light gray, the suture medially more brightened; lateral portions of the præscutum broadly and abruptly orange yellow. Pleura yellow. Halteres obscure yellow, the knobs infuscated. Legs with the coxæ and trochanters yellow; remainder of legs yellow, the femora a trifle darker just before the tips, this coloration caused more especially by an increase in dark setæ; terminal tarsal segments only slightly darkened. Wings (Plate 1, fig. 16) with the ground color brownish yellow, the cells beyond the cord even more suffused; prearcular and costal regions clear yellow, beyond the end of Sc continued to

the wing tip as yellow spots in the outer ends of cells R_2, R_3, and R_4; darker brown areas at arculus; origin of Rs; cord; fork of R_{2+3+4}; outer end of cell 1st M_2; fork of M_{1+2}; supernumerary crossvein in cell Cu, and the marginal clouds, all these areas narrowly bordered by clearer yellow rings; veins dark brown, darker in the clouded areas. Axillary crenulation of moderate size only, about one-half as deep as in the corresponding sex of *crenulata* or *caninota*. No macrotrichia on Rs or R_{2+3+4}. Venation: m-cu nearly its own length beyond the fork of M.

Abdominal tergites yellowish brown, the sternites clearer yellow, with the incisures narrowly darkened; hypopygium brownish yellow. Male hypopygium (Plate 2, fig. 34) much as in *caninota*, but the interbasal process, *i*, differently constructed, the apical notch being very small and shallow, the lobes broadly flattened.

MINDANAO, Davao district, Mount Apo, Mainit River, altitude 6,000 feet, September 16, 1930 (*C. F. Clagg*); holotype, male.

Epiphragma (*Polyphragma*) *griseicapilla* is allied to *E.* (*P.*) *crenulata* Alexander and *E.* (*P.*) *caninota* sp. nov., in the general coloration and relatively deep crenulation of the wing axilla, differing in the wing pattern and details of structure of the hypopygium.

EPIPHRAGMA (POLYPHRAGMA) ANGUSTICRENULA sp. nov. Plate 1, fig. 17; Plate 2, fig. 35.

Belongs to the *crenulata* group; general coloration of head and mesonotum light ashy gray; wings with a yellowish brown ground color, the dark pattern but slightly evident against this ground and not margined with paler; axillary crenulation of wing very shallow; male hypopygium with the interbasal process bifid at tip, the lateral arm a slender curved spine.

Male.—Length, about 7.5 millimeters; wing, 8.2.

Rostrum and palpi black. Antennæ with the scape and fusion segment obscure brownish yellow; remainder of flagellum black; fusion segment oval, involving three segments; verticils of flagellum exceeding the segments in length. Dorsum of head on front and anterior vertex light gray, the posterior vertex dark reddish brown, more blackened medially.

Mesonotum above light gray, the lateral margins of the præscutum abruptly orange yellow. Pleura obscure yellow, the dorsopleural region slightly darkened. Halteres dusky, the knobs infuscated. Legs with the coxæ and trochanters yellow; remainder of legs yellow, the terminal tarsal segments darkened.

Wings (Plate 1, fig. 17) with a yellowish brown suffusion, the prearcular and costal regions more yellowish, variegated by brown clouds at the veins; disk of wing with a diffuse brown pattern that is little conspicuous against the ground color, the areas not bordered by brighter; veins brown, yellow in the flavous costal interspaces. Axillary crenulation very shallow for this group of the subgenus, being about as wide as the prearcular cell immediately cephalad of it. Venation: Costal crossveins and spurs few, but strong and complete; m-cu about one-half its length beyond the fork of M.

Abdominal tergites light brown, bordered by dark brown laterally, the sternites yellow, with narrow darker margins. Male hypopygium (Plate 2, fig. 35) with the interbasal rods, *i*, bifid at tips, the lateral arm a slender curved spine, much as in *crenulata*, the mesal arm short and broadly truncated. Outer dististyle, *od*, relatively slender, the tip a chitinized, gently curved spine.

MINDANAO, Davao district, Mount Apo, Kidapawan trail to Lino Lake, altitude 7,000 to 8,000 feet, September 20, 1930 (*C. F. Clagg*); holotype, male.

Epiphragma (*Polyphragma*) *angusticrenula* differs from the other species of this group of the subgenus in the scarcely developed axillary crenulation of the wing, in conjunction with the other characters listed above.

ERIOPTERINI

TRENTEPOHLIA (PARAMONGOMA) CHIONOPODA sp. nov.

General coloration of thorax yellow; tips of femora white; tibiæ and tarsi white, the basal half of the former more-obscure whitish; wings grayish subhyaline, the prearcular and costal regions more yellowish.

Male.—Length, about 4 millimeters; wing, 4.2.

Rostrum and palpi brown. Antennæ with the scape dark brown, the flagellum somewhat lighter in color; flagellar verticils a little longer than the segments.

Thorax uniformly yellow. Halteres pale, the knobs weakly dusky. Legs with the coxæ and trochanters yellow; femora dirty white, the tips paling to clear white; tibiæ and tarsi white, the basal half of the former a trifle more obscure. Wings grayish subhyaline, the prearcular and costal regions light yellow; stigma small and very vague; veins pale brown, Sc light yellow. Venation: R_2 close to fork of R_{3+4}; R_3 less perpendicular and cell 1st M_2 smaller than in *banahaoensis;* cell 2d M_2 narrow.

Abdominal tergites brown medially, paler laterally; sternites light yellow, the outer segments more infuscated; hypopygium yellow.

MINDANAO, Davao district, Mount Apo, Galog River, altitude 6,000 feet, at trap lantern, September 13, 1930 (*C. F. Clagg*); holotype, male.

Trentepohlia (*Paramongoma*) *chionopoda* is readily told from the other regional species by the coloration of the legs. The type of the subgenus *Paramongoma, albitarsis* (Doleschall), of Amboina, still seems to be known only from Doleschall's insufficient description and faulty figure, which, if only approximately correct, serve to separate the two species of crane flies.

TRENTEPOHLIA (PARAMONGOMA) PUSILLA Edwards.

Trentepohlia (*Paramongoma*) *pusilla* EDWARDS, Treubia 9 (1927) 356.

MINDANAO, Davao district, Lawa, at light, April, 1930 (*C. F. Clagg*). This species was described from Sebesi Island, near Krakatau, Java, where it was taken in April, 1921, by Dammerman.

The present specimen agrees almost exactly with Edwards's description. The allied *T.* (*P.*) *banahaoensis* Alexander (Luzon) has R_3 short and more nearly erect and the tips of the femora narrowly but conspicuously whitened.

TRENTEPOHLIA (MONGOMA) ÆQUIALBA sp. nov. Plate 1, fig. 18.

General coloration of mesonotum orange fulvous, patterned with black; femora light brown, the tips abruptly snowy white, the amount subequal on all legs; bases and tips of tibiæ whitened; wings with cells C and Sc strongly blackened, the prearcular region pale; abdominal tergites yellow, with a broad black dorsomedian stripe.

Male.—Length, about 14 to 16 millimeters; wing, 8.2 to 8.6.

Female.—Length, about 14 millimeters; wing, 9.

Rostrum and labial palpi obscure yellow; maxillary palpi black. Antennæ with the scapal segments brown, the flagellum black; flagellar segments long-cylindrical, with verticils that are subequal to the segments. Head fulvous orange, the vertex carinate medially.

Mesonotal præscutum orange fulvous, narrowly darkened laterally; centers of scutal lobes darkened; scutellum testaceous brown, darker brown caudally; postnotal mediotergite black

posteriorly and on sides, a little paler medially in front. Pleura chiefly orange yellow, the ventral pleurites slightly white pruinose; in cases the pleurotergite a little darkened posteriorly. Halteres blackened, the base of the stem restrictedly yellow. Legs with the coxæ and trochanters orange yellow; femora light brown, darkened outwardly, the tips abruptly snowy white, the amount subequal on all legs; tibiæ dark brown, the bases narrowly, the tips more broadly whitened; tarsi white, the terminal segment a little darkened; femora with short black setæ distributed over the entire length, with two or three longer black setæ at apex. Wings (Plate 1, fig. 18) narrow, cells C and Sc strongly blackened, confluent with the slightly darker stigma; wing apex narrowly infuscated; vague and narrow, scarcely evident dark seams on posterior cord; cell Cu and a spot between anal veins at point of divergence dark brown; prearcular region pale; veins black, the outer branches of M paler. Venation: R_2 about two-thirds to three-fourths its length before fork of R_{3+4}; veins R_3 and R_4 very strongly divergent; m-cu at or shortly before fork of M; fusion of Cu_1 and 1st A very slight to punctiform.

Abdominal tergites yellow laterally, with a broad black dorsomedian stripe; sternites more extensively yellow, the subcaudal margins narrowly darkened; extreme apices of segments silvery; subterminal segments and hypopygium blackened.

MINDANAO, Davao district, Mount Apo, Mainit River, altitude 6,500 feet, September 14, 1930; Galog River trail, altitude 5,000 to 6,000 feet, September 12, 1930 (*C. F. Clagg*); holotype, male; allotype, female; paratypes, 2 males.

The present species, and the two next defined, are all allied to *T.* (*M.*) *luzonensis* Edwards, from which they may be separated by the following key:

1. Tibiæ of all legs approximately alike in color ..... 2.
   Tips of fore tibiæ broadly blackened, of posterior tibiæ even more broadly snowy white ..... *T.* (*M.*) *luzonensis* Edwards.
2. Tips of femora and tibiæ snowy white ..... *T.* (*M.*) *æquialba* sp. nov.
   Tips of femora and tibiæ blackened ..... 3.
3. Mesonotal præscutum polished black, the humeral region yellow; a dark area on anepisternum; abdominal tergites blackened.
   T. (*M.*) *æquinigra* sp. nov.
   Mesonotal præscutum yellow, in cases restrictedly darkened at suture; pleura uniformly pale; abdominal tergites yellow with a narrow, more or less interrupted, dorsomedian black stripe.
   T. (*M.*) *majuscula* sp. nov.

TRENTEPOHLIA (MONGOMA) ÆQUINIGRA sp. nov. Plate 1, fig. 19.

General coloration of mesonotum polished black, the humeral region of the præscutum extensively yellow; pleura yellow, the dorsal anepisternum darkened; femora yellow, the tips of all narrowly but conspicuously blackened, the amount subequal on all legs; fore femora (male) broadly darkened on central portion; wings narrow, whitish, the costal border light yellow; wing tip narrowly darkened; abdominal tergites and a subterminal ring black, the sternites light yellow.

Male.—Length, about 13 millimeters; wing, 8.5 by 1.6.

Female.—Length, about 10 to 13 millimeters; wing, 7.2 by 1.5 to 9 by 1.75.

Rostrum and palpi brownish black. Antennæ with the scapal segments black; flagellum broken. Head brownish gray, clearer gray in front, the vertex carinate.

Pronotum obscure yellow. Mesonotal præscutum polished yellow, the lateral margins as far cephalad as the pseudosutural foveæ, together with a median line almost to the cephalic margin, blackened, leaving the humeral region extensively of the ground color; posterior sclerites of mesonotum chiefly blackened, the median area of the scutum a little brighter. Pleura abruptly yellow, with a large dark area on the dorsal anepisternum. Halteres brownish black, the base of the stem brightened. Legs with the coxæ and trochanters yellow; femora yellow, the tips of all legs somewhat narrowly but conspicuously blackened, the amount equal on all legs; in male, the general coloration of the fore femora is darker brown in the central portion, the tips again dark brown as described; tibiæ obscure yellow, the tips blackened; tarsi yellow; all femora with small scattered black setæ distributed over the entire length. Wings (Plate 1, fig. 19) narrow, whitish, the prearcular and costal regions light yellow; wing apex narrowly darkened; stigma small, dark brown; vague, scarcely evident dark seams along cord, the veins of the radial field, vein Cu_1, and a spot between the anal veins at point of divergence; veins dark brown, yellow in the flavous areas. Venation: R_2 about one-half its length before the fork of R_{3+4}; inner ends of cells R_5 and M_3 nearly in alignment; m-cu shortly before the fork of M; apical fusion of Cu_1 and 1st A punctiform.

Abdominal tergites black, the sternites abruptly orange yellow; a conspicuous subterminal black ring; female genitalia yellow horn color; male hypopygium chiefly darkened.

MINDANAO, Davao district, Mount Apo, Mainit River, altitude 6,500 feet, September 5, 1930 (*C. F. Clagg*); holotype, male; allotype, female; paratype, female.

The paratype is much smaller than the other types, as shown by the measurements. By my key to the Philippine species of *Trentepohlia* [2] the present species runs to couplet 10, disagreeing with both included species in the venation and wing pattern. The fly is most nearly related to *T.* (*M.*) *luzonensis* Edwards and allied species that have been discussed and keyed under the description of *T.* (*M.*) *æquialba* sp. nov.

TRENTEPOHLIA (MONGOMA) MAJUSCULA sp. nov. Plate 1, fig. 20.

Male.—Length, about 15 to 16 millimeters; wing, 10 to 10.5.

Female.—Length, about 16 to 16.5 millimeters; wing, 11.3 to 11.5.

Closely allied to *T.* (*M.*) *æquinigra* sp. nov., differing especially in the larger size and details of coloration.

Mesonotal præscutum rich fulvous orange, most intense medially, in cases entirely clear, in other specimens (including the holotype) narrowly blackened on either side at the suture; scutum with an irregular brown area on either lobe; scutellum chiefly testaceous yellow; postnotal mediotergite with the central portion yellow, the posterior margins darkened, the lateral portions again brightened. Pleura yellow to orange yellow. Halteres yellow, the knobs dark brown. Legs long and powerful; coxæ and trochanters concolorous with the pleura; femora chiefly light brown, the bases narrowly more yellowish, the tips narrowly blackened, the amount of the latter subequal on all legs; tibiæ brown, the tips broadly blackened; basitarsi black, the outer segments paling to brown; femora with scattered black setæ scattered over the entire length; a group of slightly longer and more erect setæ at base of posterior tibiæ. Wings (Plate 1, fig. 20) narrow, whitish, the prearcular and costal regions yellow; stigma small, dark brown; wing tip very narrowly infumed; Cu, the cord and veins of the radial field narrowly and vaguely seamed with darker; the usual small dark spot between anal veins present; veins black, C, Sc, and R more yellowish. Venation: Veins R_3 and R_4 strongly divergent; inner end of cell M_3 lying slightly proximad of cell R_5, the basal section of M_3 being angulated; m-cu at or close to the fork of M; apical fusion of Cu_1 and 1st A punctiform.

[2] Philip. Journ. Sci. 43 (1930) 297–298.

Abdominal tergites chiefly yellow, with a narrow, more or less broken, black longitudinal stripe; sternites uniformly yellow; subterminal segments and male hypopygium black. Ovipositor with the bases and valves yellowish horn color.

MINDANAO, Davao district, Mount Apo, Mainit River, altitude 6,500 feet; Seliban River, 7,000 feet; Galog River trail, 5,000 to 6,000 feet, September 10 to 12, 1930 (*C. F. Clagg*); holotype, male; allotype, female; paratypes, 1 male, 1 female.

The relationships are shown by the key to the Philippine species of *Trentepohlia* allied to *luzonensis*, as given under the definition of *T.* (*M.*) *æquialba* sp. nov.

TRENTEPOHLIA (TRENTEPOHLIA) LÆTIPENNIS sp. nov. Plate 1, fig. 21.

Rostrum and palpi black; antennæ with the basal segment of scape black, the flagellum pale; mesonotal præscutum and scutum obscure yellow, unmarked; posterior sclerites of mesonotum brown; pleura blackened, with a more or less distinct longitudinal pale stripe on dorsal sternopleurite; halteres black, the extreme base of the stem yellow; legs yellow; wings whitish, with a heavy dark brown pattern arranged as in the *ornatipennis* group; vein R_3 straight to slightly concave, the cell pointed at base; basal abdominal segments reddish yellow, the remainder blackened.

Male.—Length, about 4.5 millimeters; wing, 5.5.

Female.—Length, about 5.5 to 6 millimeters; wing, 5 to 5.5.

Rostrum and palpi black. Antennæ with the basal segment of scape black, the pedicel and flagellum pale brownish yellow, more darkened outwardly; antennæ (male) relatively elongate, if bent backward extending almost to the wing root; flagellar segments long-cylindrical, the verticils shorter than the segments. Head brownish gray.

Mesonotal præscutum and scutum obscure yellow, the scutellum and postnotal mediotergite more infuscated. Pleura dark brown, with a more or less distinct paler longitudinal stripe on the dorsal sternopleurite. Halteres black, the extreme base of the stem yellow. Legs with the coxæ blackened; trochanters obscure yellow; remainder of legs yellow. Wings (Plate 1, fig. 21) whitish, with a heavy dark brown pattern, arranged on the plan of *ornatipennis* and allies; very heavy brown areas at the wing base; at mid-length of wing, sending extensions to vein M at origin of Rs and to the fork of Rs along the anterior cord; cells beyond the cord chiefly darkened, variegated by three white marginal areas in ends of cells R_2, R_3, and $R_4 + R_5$; cubital and

anal cells chiefly clear; veins Cu and m-cu seamed with brown; outer portion of cell 1st A extensively clouded with gray; veins pale, dark in the infuscated areas. Venation: Rs a trifle longer than R_{2+3+4}; vein R_3 straight or very gently concave, the inner end of the cell thus pointed; second section of M and R_5 + M_{1+2} subequal and both about equal to the basal section of M_{1+2}; apical fusion of Cu_1 and 1st A slight.

Abdomen with the basal four segments reddish yellow, the remainder of the abdomen, including the hypopygium and ovipositor, black; in female, the lateral margins of the basal segments more or less darkened.

MINDANAO, Davao district, Mount Apo, Galog River, altitude 6,000 feet, September 16 to 26, 1930 (*C. F. Clagg*); holotype, male; allotype, female; paratypes, 1 male, 2 females.

Trentepohlia (*Trentepohlia*) *lætipennis* is closely allied to species such as *T.* (*T.*) *ornatipennis* Brunetti (southwest India), *T.* (*T.*) *festivipennis* Edwards (Perak), and *T.* (*T.*) *venustipennis* Edwards (Borneo). It differs in the coloration of the body and the details of wing pattern and venation, falling closest to *ornatipennis* in the wing pattern but differing therefrom in the venation of the radial field and coloration of the body. In the present species, and very possibly in the other species of the group, the tip of R_{1+2} is atrophied.

TRENTEPOHLIA (ANCHIMONGOMA) APOICOLA sp. nov. Plate 1, fig. 22.

Head dark gray; general coloration of mesonotum dark brown, the humeral region extensively obscure yellow; pleura yellow, the ventral sternopleurite infuscated; tibiæ with the central half to three-fifths blackened.

Male.—Length, about 7 to 8.5 millimeters; wing, 7 to 8.

Rostrum dark, the labial palpi yellow; maxillary palpi black. Antennæ black throughout; flagellar segments with verticils that exceed the segments. Head dark gray.

Mesonotal præscutum medially dark brown to black, more intense in front, the humeral region extensively obscure yellow; posterior sclerites of mesonotum chiefly darkened, the scutellum obscure yellow. Pleura obscure yellow, the ventral sternopleurite infuscated. Halteres brownish black, the base of the stem restrictedly obscure yellow. Legs with the coxæ and trochanters yellow; femora black, the tips broadly and conspicuously snowy white, the amount subequal on all the legs; tibiæ black, the central portion blackened, most extensively on the posterior legs where about three-fifths of the segment is included; tarsi white.

Wings (Plate 1, fig. 22) grayish, cells C, Sc, and the apex a trifle darker; veins dark brown, those of the medial field paler. Venation: Sc_1 ending opposite the cephalic end of R_2, Sc_2 opposite the fork of Rs; cell Cu widely open at margin.

Abdomen dark brown, the basal sternites more yellowish; hypopygium black.

MINDANAO, Davao district, Mount Apo, altitude 6,000 to 8,000 feet, August 30 to September 22, 1930 (*C. F. Clagg*); holotype, male; paratypes, several males.

Trentepohlia (*Anchimongoma*) *apoicola* is very close to *T.* (*A.*) *niveipes* Edwards (Java), differing only in the details of coloration of the body and the slightly increased amount of black on the posterior tibiæ.

ILLUSTRATIONS

[Legend: *a*, ædeagus; *b*, basistyle; *d*, dististyle; *g*, gonapophysis; *i*, interbasal process; *id*, inner dististyle; *od*, outer dististyle; *p*, phallosome; *t*, tergite.]

Plate 1

Fig. 1. *Limonia* (*Laosa*) *manobo* sp. nov., wing.
2. *Limonia* (*Limonia*) *bilan* sp. nov., wing.
3. *Limonia* (*Limonia*) *atroaurata* sp. nov., wing.
4. *Limonia* (*Limonia*) *bagobo* sp. nov., wing.
5. *Limonia* (*Limonia*) *subpacata* sp. nov., wing.
6. *Limonia* (*Limonia*) *subprolixa* sp. nov., wing.
7. *Helius* (*Helius*) *procerus* sp. nov., wing.
8. *Helius* (*Helius*) *apoensis* sp. nov., wing.
9. *Thaumastoptera* (*Thaumastoptera*) *maculivena* sp. nov., wing.
10. *Adelphomyia apoana* sp. nov., wing.
11. *Adelphomyia paucisetosa* sp. nov., wing.
12. *Epiphragma* (*Polyphragma*) *fuscofasciata* sp. nov., wing.
13. *Epiphragma* (*Polyphragma*) *nigrotibiata* sp. nov., wing.
14. *Epiphragma* (*Polyphragma*) *apoensis* sp. nov., wing.
15. *Epiphragma* (*Polyphragma*) *caninota* sp. nov., wing.
16. *Epiphragma* (*Polyphragma*) *griseicapilla* sp. nov., wing.
17. *Epiphragma* (*Polyphragma*) *angusticrenula* sp. nov., wing.
18. *Trentepohlia* (*Mongoma*) *æquialba* sp. nov., wing.
19. *Trentepohlia* (*Mongoma*) *æquinigra* sp. nov., wing.
20. *Trentepohlia* (*Mongoma*) *majuscula* sp. nov., wing
21. *Trentepohlia* (*Trentepohlia*) *lætipennis* sp. nov., wing.
22. *Trentepohlia* (*Anchimongoma*) *apoicola* sp. nov., wing.

Plate 2

Fig. 23. *Limonia* (*Limonia*) *bagobo* sp. nov., male hypopygium.
24. *Limonia* (*Limonia*) *subpacata* sp. nov., male hypopygium.
25. *Limonia* (*Limonia*) *subprolixa* sp. nov., male hypopygium.
26. *Helius* (*Helius*) *procerus* sp. nov., male hypopygium.
27. *Thaumastoptera* (*Thaumastoptera*) *maculivena* sp. nov., male hypopygium.
28. *Adelphomyia paucisetosa* sp. nov., male hypopygium.
29. *Epiphragma* (*Polyphragma*) *latitergata* sp. nov., male hypopygium.
30. *Epiphragma* (*Polyphragma*) *nigrotibiata* sp. nov., male hypopygium.
31. *Epiphragma* (*Polyphragma*) *apoensis* sp. nov., male hypopygium.
32. *Epiphragma* (*Polyphragma*) *hastata* sp. nov., male hypopygium.
33. *Epiphragma* (*Polyphragma*) *caninota* sp. nov., male hypopygium.
34. *Epiphragma* (*Polyphragma*) *griseicapilla* sp. nov., male hypopygium.
35. *Epiphragma* (*Polyphragma*) *angusticrenula* sp. nov., male hypopygium.

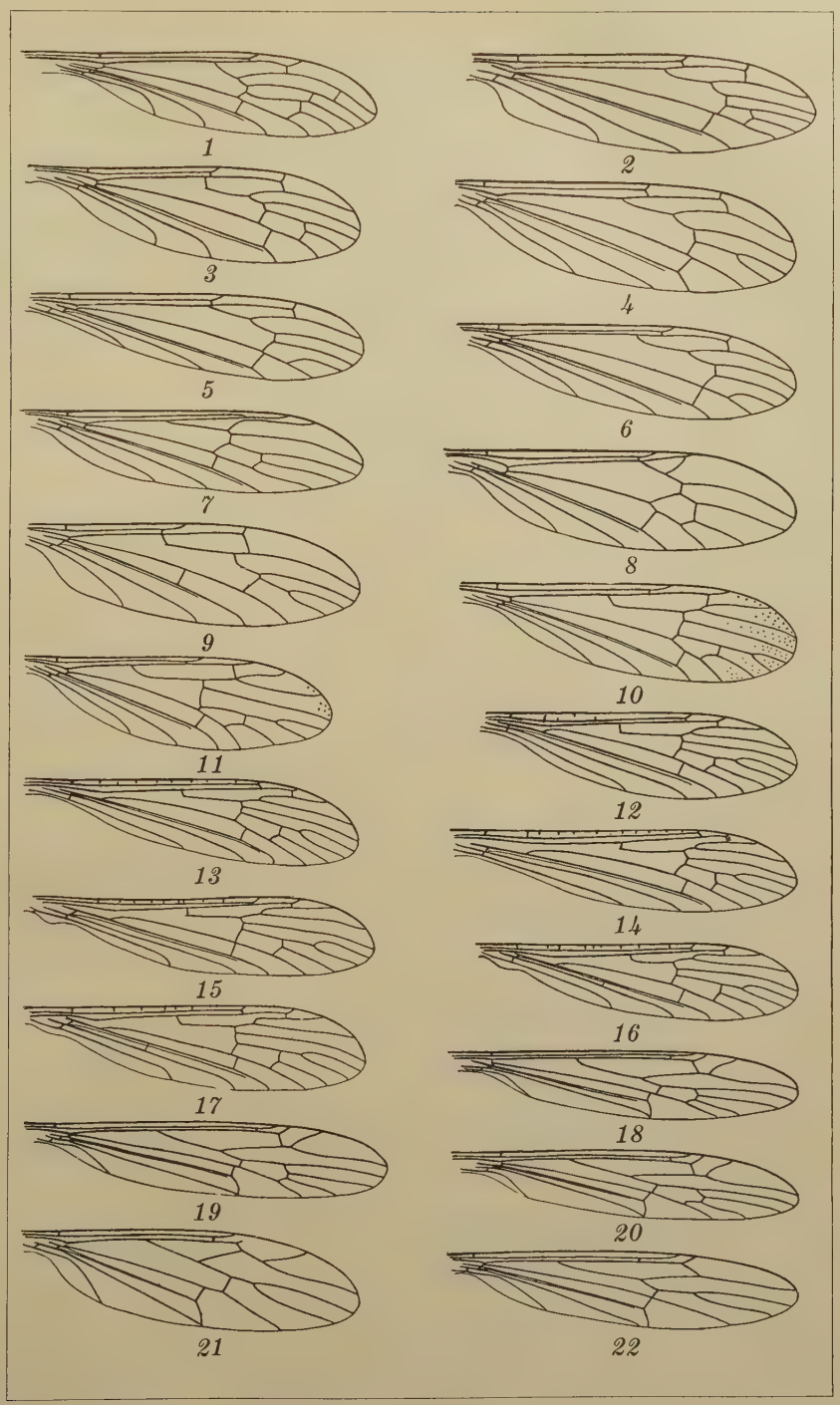


PLATE 1.

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PLATE 2.

SECOND SUPPLEMENT TO THE LIST OF THE LOWER FUNGI OF THE PHILIPPINE ISLANDS [1]

A BIBLIOGRAPHIC LIST CHRONOLOGICALLY ARRANGED, AND WITH LOCALITIES AND HOSTS

By C. F. Baker

Late Dean of the College of Agriculture, Los Baños, Philippine Islands

Edited by F. L. Stevens

Charles Fuller Baker Memorial Professor (1930–1931) of Plant Pathology

UREDINALES

PUCCINIACEÆ

HEMILEIA CANTHII Berk. and Br.

On *Plectronia.* Baker, Philip. Agr. & For. 3 (1914) 160; Philip. Journ. Sci. 13 (1918) 379.

On *Plectronia horrida.* Ann. Myc. 26 (1928) 419.

HEMILEIA VASTATRIX Berk. and Br.

On *Coffea arabica.* Baker, Philip. Agr. & For. 3 (1914) 160; Ann. Myc. 15 (1917) 175; Philip. Journ. Sci. 13 (1918) 379; Ann. Myc. 26 (1928) 419; Philip. Agr. 17 (1928) 45.

On *Coffea* spp. Philip. Agr. & For. 6 (1917) 251; Phytopath. 9 (1919) 122; Philip. Agr. 15 (1926) 125; Philip. Agr. Rev. 19 (1926) 252.

[1] Contribution from the Experiment Station of the College of Agriculture, Los Baños, Laguna, Philippine Islands. Published with the approval of the Director of the Experiment Station.

The editor has chosen to print this article as nearly as possible as it was left in manuscript by Dean Baker, with the exception of a considerable number of added references, rather than to make changes of which he might not have approved. The arrangement followed is essentially that of the two earlier Baker lists. Some of the references give no internal evidence that the fungi in question occur in the Philippines, but the fact that they were placed in Dean Baker's manuscript makes it presumptive that they do so occur. Dean Baker's work on the manuscript ceased about 1921.

For the convenience of those who will use this list the editor will issue later a combined index to the fungi of the Philippine Islands.

Dr. G. O. Ocfemia, of the Department of Plant Pathology of the College of Agriculture, at Los Baños, rendered valuable assistance in the gathering of materials for this manuscript.

HAMASPORA ACUTISSIMA Syd.

On *Rubus moluccanus*. Ann. Myc. 15 (1917) 174; 26 (1928) 418.

PUCCINIA CITRATA Syd.

On *Andropogon citratus*. BAKER, Philip. Agr. & For. 3 (1914) 158; Philip. Journ. Sci. 13 (1918) 379; Ann. Myc. 21 (1923) 93.

PUCCINIA CONGESTA Berk. and Br.

On *Polygonum chinensis*. Ann. Myc. 15 (1917) 173.

On *Polygonum tomentosum*. Ann. Myc. 26 (1928) 416.

PUCCINIA ENGLERIANA P. Henn.

On *Tabernaemontana campanulata*. Ann. Myc. 15 (1917) 173.

PUCCINIA EREBIA Syd.

On *Clerodendron minahassae*. Ann. Myc. 15 (1917) 172.

On *Clerodendron inermis*. Ann. Myc. 26 (1928) 416.

PUCCINIA HETEROSPORA Berk. and Curt.

On *Sida javensis*. Philip. Journ. Sci. 13 (1918) 379; Ann. Myc. 26 (1928) 416.

PUCCINIA KUEHNII (Krueg.) Butl. [Uredo kuehnii (Krueg.) Wakk. and Went.]

On *Saccharum officinarum*. BAKER, Philip. Agr. & For. 3 (1914) 164; Philip. Agr. Rev. 11 (1918) 275; REINKING, Philip. Journ. Sci. 15 (1918) 169; Phytopath. 9 (1919) 135; Philip. Agr. Rev. 14 (1921) 430; Ann. Myc. 26 (1928) 417.

PUCCINIA MERRILLII P. Henn.

On *Smilax bracteata*. Ann. Myc. 15 (1917) 173.

On *Smilax reticulata*. Leafl. Philip. Bot. 9 (1925) 3133.

PUCCINIA PAULLULA Syd.

On *Amorphophallus campanulatus*. Ann. Myc. 15 (1917) 173; 26 (1928) 417.

PUCCINIA PHILIPPINENSIS Syd.

On *Cyperus compressus*. Ann. Myc. 15 (1917) 173.

PUCCINIA PURPUREA Cke.

On *Andropogon sorghum* (*Sorghum vulgare, Holcus sorghum*). SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 16—Los Baños (*Baker 3747*); BAKER, Philip. Journ. Sci. 5 (1916) 77; Philip. Agr. & For. 5 (1916) 77; Ann. Myc. 15 (1917) 174; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 137; Ann. Myc. 26 (1928) 417.

On *Andropogon halepensis*. Ann. Myc. 21 (1923) 93.

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PUCCINIOSTELE CLARKIANA (Barcl.) Diet.

On *Astilbe philippinensis*. Ann. Myc. 15 (1917) 175.

SPHAEROPHRAGMIUM LUZONICUM Yates.

On *Albizzia procera.* Philip. Journ. Sci. 13 (1918) 379; Ann. Myc. 20 (1922) 66; 26 (1928) 418.

UROMYCES APPENDICULATUS (Pers.) Lk.

On *Vigna* spp. Philip. Agr. & For. 4 (1914) 164; 5 (1916) 77; Ann. Myc. 21 (1923) 93.

On *Phaseolus* spp. REINKING, Philip. Journ. Sci. 13 (1918) 169; Philip. Agr. 10 (1922) 349.

On *Phaseolus mungo.* Phytopath. 9 (1919) 132.

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UROMYCES LINEARIS Berk. and Br.

On *Panicum.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 16—Los Baños (*Baker 3736*).

On *Panicum repens.* Ann. Myc. 15 (1917) 172; 26 (1928) 415.

UROMYCES MUCUNAE Rabh.

On *Mucuna deeringiana* (*Stizolobium deeringianum*). BAKER, Philip. Agr. & For. 3 (1914) 164; Philip. Journ. Sci. 13 (1918) 168.

On *Mucuna cochinchinensis* (*M. nivea, Stizolobium niveum*). Phytopath. 9 (1919) 132; Ann. Myc. 26 (1928) 415.

UROMYCES SOJAE Syd.

On *Glycine max* (*G. hispida, G. sojae*). BAKER, Philip. Agr. & For. 3 (1914) 161; Ann. Myc. 15 (1917) 172; Philip. Journ. Sci. 13 (1918) 167; Phytopath. 9 (1919) 126.

UROMYCES WEDELIAE P. Henn.

SACCARDO, Syll. Fung. 17 (1895) 245; HENNINGS, Hedwigia, (1904) 150—Japan; BACCARINI, Ann. Bot. 4 (1907) tab. 10, f. 9; SYDOW, Monogr. Ured. 2 (1907) 15; Ann. Myc. 15 (1917) 172.

COLEOSPORIACEÆ

COLEOSPORIUM EXACI Syd.

On *Exacum chironioides.* Ann. Myc. 26 (1928) 425.

COLEOSPORIUM KNOXIAE Syd.

On *Knoxia corymbosa.* Ann. Myc. 26 (1928) 425.

COLEOSPORIUM MERRILLII P. Henn.

On Orchidaceae. BAKER, Philip. Agr. & For. 3 (1914) 163.

SCHROETERIASTER CINGENS Syd.

On *Bridelia glabrifolia.* Ann Myc. 26 (1928) 423.

MELAMPSORACEÆ

KUEHNEOLA DESMIUM (Berk. and Br.) Arth.

On *Gossypium* spp. BAKER, Philip. Agr. & For. 3 (1914) 161; Philip. Journ. Sci. 13 (1918) 167.

KUEHNEOLA FICI (Cast.) Butl.

On *Ficus carica*. BAKER, Philip. Agr. & For. 3 (1914) 161; Philip. Journ. Sci. 13 (1918) 167; Phytopath. 9 (1919) 124, 128.

On *Morus alba* (*M. albus*). BAKER, Philip. Agr. & For. 3 (1914) 162; Ann. Myc. 15 (1917) 175.

KUEHNEOLA FICI (Cast.) Butl. f. MORICOLA P. Henn.

On *Morus alba* (*M. albus*). SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 16—Los Baños (*Baker 3735*); Syll. Fung. 17 (1916) 451 (*Uredo moricola*); Syll. Fung. 9 (1916) 334 (*Uredo mori*); Philip. Journ. Sci. 13 (1918) 168.

PHAKOSPORA PACHYRHIZI Syd.

On *Pachyrrhizus erosus* (*P. angulatus*, *Carcara erosa*). Philip. Agr. & For. 4 (1914) 163; Ann. Myc. 15 (1917) 175; Philip. Journ. Sci. 13 (1918) 168; Phytopath. 9 (1919) 131; Ann. Myc. 26 (1928) 422.

PHAKOSPORA PHYLLANTHI Diet.

On *Phyllanthus* sp. Ann. Myc. 15 (1917) 175.

On *Phyllanthus niruri*. Ann. Myc. 26 (1928) 423.

UREDINALES IMPERFECTI

AECIDIUM ALCHORNEAE Sacc.

On *Alchornea rugosa*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 17—Mount Maquiling (*Baker 3786*).

AECIDIUM BANOSENSE Syd.

On *Vernonia vidali*. Ann. Myc. 26 (1928) 426.

AECIDIUM BLUMEAE P. Henn.

On *Blumea balsamifera*. Ann. Myc. 15 (1917) 176; 26 (1928) 426.

AECIDIUM CLERODENDRI P. Henn.

On *Clerodendron fragrans*. Ann. Myc. 15 (1917) 176.

AECIDIUM ELAEAGNI-LATIFOLIAE Petch.

On *Elaeagnus philippinensis*. Ann. Myc. 26 (1928) 426.

AECIDIUM FLAVIDUM Berk. and Br.

On *Pavetta indica*. Leafl. Philip. Bot. 9 (1925) 3133.

AECIDIUM KAERNBACHII P. Henn.

On *Ipomoea pes-caprae*. Ann. Myc. 15 (1917) 176.

On *Lepistemon flavescens*. Philip. Journ. Sci. 13 (1918) 378; Ann. Myc. 26 (1928) 427.

AECIDIUM LAGUNENSE Syd.

On *Gymnema tingentis*. Ann. Myc. 26 (1928) 427.

AECIDIUM LUZONIENSE P. Henn.

On *Phyllanthus* sp. Ann. Myc. 26 (1928) 427.

AECIDIUM NUMMULARE Berk.

On *Ceropegia* sp. Ann. Myc. 26 (1928) 427.

AECIDIUM PAEDERIAE Diet.

On *Paederia foetida* (*P. tomentosa*). Ann. Myc. 15 (1917) 176; 26 (1928) 427.

AECIDIUM RHYTISMOIDEUM Berk. and Br.

On *Diospyros discolor*. Philip. Journ. Sci. 13 (1918) 379.

AECIDIUM UVARIAE-RUFAE P. Henn.

On *Uvaria rufa*. Ann. Myc. 15 (1917) 176; 26 (1928) 428.

UREDO ARTHRAXONIS-CILLARIS P. Henn.

On *Arthraxonis* sp. Ann. Myc. 15 (1917) 177.

On *Anthraxonis quartiniani*. Ann. Myc. 26 (1928) 428.

UREDO CLAOXYLI Sacc.

On *Claoxylum* sp. SACCARDO, Ann. Myc. 13 (1915) 126—Mount Maquiling (*Baker 2787*).

UREDO DAVAOENSIS Syd.

On *Cyanotis axillaris*. Ann. Myc. 26 (1928) 428.

UREDO DESMIUM (Berk. and Br.) Petch.

On *Gossypium* sp. Philip. Journ. Sci. 13 (1918) 167; Phytopath. 9 (1919) 126.

UREDO DIOSCOREAE (Berk. and Br.) Petch.

On *Dioscorea esculenta*. Philip. Journ. Sci. 13 (1918) 167; Phytopath. 9 (1919) 124.

UREDO DIOSCOREAE-ALATAE Rac.

On *Dioscorea alata*. BAKER, Philip. Agr. & For. 3 (1914) 161; Ann. Myc. 15 (1917) 177.

On *Dioscorea esculenta*. Philip. Journ. Sci. 13 (1918) 167.

On *Dioscorea*. Phytopath. 9 (1919) 124.

UREDO ERYTHRINAE P. Henn.

On *Erythrina indica*. HENNINGS, Ann. Mus. du Congo 5, II, Fasc. iii (1908) 224—Congo; SACCARDO and TROTTER, Syll. Fung. 21 (1912) 790; Ann. Myc. 15 (1917) 177.

UREDO FICI Cast.

On *Ficus carica* Linn. Philip. Journ. Sci. 13 (1918) 167.

UREDO MANILENSIS Syd.

On *Tabernaemontana polygama*. Ann. Myc. 15 (1917) 177.

UREDO OCHRACEA Diet.

On *Commelina*. DIETEL, Hedwigia 35 (1897)—Brazil; SACCARDO and SYDOW, Syll. Fung. 14 (1899) 403.

UREDO OPERCULINAE Syd.

On *Operculina turpethum*. Ann. Myc. 15 (1917) 177; 26 (1928) 429.

UREDO PREMNAE Koord.

On *Premna vestita.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 16—Los Baños (*Baker 3828*).

On *Premna cumingiana.* Ann. Myc. 15 (1917) 177.

UREDO VIGNAE Bres.

On *Vigna* spp. BAKER, Philip. Agr. & For. 3 (1914) 164 [*Uromyces appendiculatus* (Pers.) Lk.]; BAKER, Philip. Agr. & For. 5 (1916) 77; Philip. Journ. Sci. 13 (1918) 170; Phytopath. 9 (1919) 139.

On *Phaseolus mungo.* Ann. Myc. 15 (1917) 177.

On *Glycine hispida* (*G. max, G. sojae*). Ann. Myc. 21 (1923) 94.

USTILAGINALES

USTILAGINACEÆ

CINTRACTIA AXICOLA (Berk.) Cornu.

On *Fimbristylis diphylla.* Ann. Myc. 15 (1917) 178.

USTILAGO ANDROPOGONIS-ACICULATI Petch.

On *Andropogon aciculatus.* Ann. Myc. 26 (1928) 430.

USTILAGO FLAGELLATA Syd.

On *Rottboellia exaltata.* Ann. Myc. 15 (1917) 178; 26 (1928) 430.

USTILAGO ISACHNES Syd.

On *Isachne miliacea.* Ann. Myc. 15 (1917) 178; 26 (1928) 430.

USTILAGO MANILENSIS Syd.

On *Panicum indicum.* Ann. Myc. 15 (1917) 178.

USTILAGO SCITAMINEA (Rabh.) Syd. (Ustilago sacchari Rabh.)

On *Saccharum officinarum.* Philip. Agr. Rev. 1 (1908) 295; 2 (1909) 14; BAKER, Philip. Agr. & For. 3 (1914) 164; 5 (1916) 76; Philip. Journ. Sci. 13 (1918) 169; Philip. Agr. Rev. 11 (1918) 275; Phytopath. 9 (1919) 135; Philip. Agr. Rev. 14 (1921) 428; 18 (1925) 562.

USTILAGO SORGHI (Lk.) Pass.

On *Andropogon sorghum* (*Sorghum vulgare, Holcus sorghum*). Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 137.

USTILAGO TONGLINENSIS Tracy and Earle.

On *Ischaemum aristatum.* Ann. Myc. 15 (1917) 178; 26 (1928) 430.

TILLETIACEÆ

ENTYLOMA ORYZAE Syd.

On *Oryza sativa.* BAKER, Philip. Agr. & For. 4 (1914) 163; Philip. Journ. Sci. 13 (1918) 378; Phytopath. 9 (1919) 131.

PERISPORIALES

ERYSIPHACEÆ

PHYLLACTINIA SUFFULTA (Rebent.) Sacc.

On *Morus alba.* Philip. Agr. & For. 4 (1914) 162; Philip. Journ. Sci. 13 (1918) 168; Phytopath. 9 (1919) 128.

PERISPORIACEÆ

ACTINODOTHIS PIPERIS Syd.

On *Piper retrofractum.* BAKER, Leafl. Philip. Bot. 7 (1914) 2451; THEISSEN and SYDOW, Ann. Myc. 13 (1915) 255; Philip. Journ. Sci. 12 (1917) 374; Ann. Myc. 15 (1917) 223; 26 (1928) 439.

BALLADYNA VELUTINA (Berk. and Curt.) v. Hoehnel.

On *Plectronia didyma.* Ann. Myc. 15 (1917) 180.

DIMERINA GRAFFII Syd.

On *Meliola micromera* Syd. on *Gmelia philippinensis.* Ann. Myc. 15 (1917) 199.

DIMERIUM TAYABENSE Yates.

On *Momordica* sp. Ann. Myc. 20 (1928) 69; Philip. Journ. Sci. 12 (1917) 362.

MELIOLA AFFINIS Syd.

On *Memecylon* sp. Philip. Journ. Sci. 12 (1917) 362.

MELIOLA ALIENA Syd.

On fallen branches. Ann. Myc. 15 (1917) 181.

MELIOLA ALSTONIAE Koord.

On *Alstonia scholaris.* Ann. Myc. 15 (1917) 181.
On *Alstonia.* Leafl. Philip. Bot. 9 (1925) 3133.

MELIOLA ARACHNOIDEA Speg.

On *Triumfetta* sp. Ann. Myc. 15 (1917) 182.

MELIOLA ARUNDINIS Pat.

On *Phragmites vulgaris.* Ann. Myc. 15 (1917) 182; Leafl. Philip. Bot. 9 (1925) 3133.
On *Saccharum officinarum.* Philip. Agr. & For. 5 (1916) 343; Philip. Agr. Rev. 11 (1918) 275; Philip. Journ. Sci. 13 (1918) 169; Phytopath. 9 (1919) 136; Philip. Agr. Rev. 14 (1921) 431.

MELIOLA BAKERI Syd.

On *Tetrastigma* sp. Ann. Myc. 14 (1916) 355; 15 (1917) 182; Leafl. Philip. Bot. 9 (1925) 3134.

MELIOLA CALLICARPAE Syd.

On *Callicarpa cana.* Ann. Myc. 15 (1917) 182.
On *Callicarpa* sp. Philip. Journ. Sci. 13 (1918) 362.

MELIOLA CALLISTA Rehm.

On *Premna odorata.* Ann. Myc. 15 (1917) 183.

MELIOLA CITRICOLA Syd.

On *Citrus* sp. Ann. Myc. 15 (1917) 183; REINKING, Philip. Agr. 9 (1920) 138; Ann. Myc. 21 (1923) 96.

MELIOLA CLERODENDRICOLA P. Henn.

On *Clerodendron* sp. Philip. Journ. Sci. 13 (1918) 363.

MELIOLA COOKEANA Speg. var. SACCARDOI Syd.

On *Litsea mollis.* SYDOW, Ann. Myc. 170—Chile (1904); SACCARDO, Syll. Fung. 17 (1905) 546.
On *Litsea glutinosa.* Ann. Myc. 15 (1917) 184.

MELIOLA CYLINDROPHORA Rehm.

On *Guioa perrottetii.* Ann. Myc. 15 (1917) 184.
On *Itea macrophylla.* Ann. Myc. 21 (1923) 95.

MELIOLA DESMODII Karst. and Roum.

On *Desmodium pulchellum.* Ann. Myc. 15 (1917) 185.

MELIOLA DICHOTOMA Berk. and Cke.

On *Phragmitis karka.* Ann. Myc. 15 (1917) 185.

MELIOLA ELMERI Syd.

On *Pittosporum pentandrum.* Ann. Myc. 15 (1917) 185.
On *Pittosporum* sp. Ann. Myc. 21 (1923) 96.

MELIOLA GYMNOSPORIAE Syd.

On *Gymnospora spinosa.* Philip. Journ. Sci. 13 (1918) 363.

MELIOLA HEWITTIAE Rehm.

On *Hewittia sublobata.* Philip. Journ. Sci. 12 (1917) 362; Ann. Myc. 15 (1917) 186; 21 (1923) 96.

MELIOLA HYPTIDIS Syd.

On *Hyptis suaveolens.* Ann. Myc. 15 (1917) 186; Leafl. Philip. Bot. 9 (1925) 3134.

MELIOLA INTRICATA Syd.

On *Scirpus grossus.* Ann. Myc. 15 (1917) 186.

MELIOLA MACARANGAE Syd. (Meliola apayaoensis Yates.)

On *Macaranga tanarius.* Ann. Myc. 15 (1917) 188; Philip. Journ. Sci. 13 (1918) 364; Ann. Myc. 20 (1922) 67.

MELIOLA MANGIFERAE Earle.

On *Mangifera indica.* BAKER, Philip. Agr. & For. 4 (1914) 162; Ann. Myc. 15 (1917) 189; Philip. Journ. Sci. 13 (1918) 363; Phytopath. 9 (1919) 127; Ann. Myc. 21 (1923) 97.

MELIOLA MERREMIAE Rehm.

On *Merremia hederacea.* Ann. Myc. 15 (1917) 190.

MELIOLA MERRILLII Syd.

On *Cissus* sp. Ann. Myc. 15 (1917) 190.

MELIOLA MITRAGYNES Syd.

On *Mitragyne rotundifolia.* Philip. Journ. Sci. 13 (1918) 363.

MELIOLA PANICI Earle.

On *Rottboellia exaltata.* Ann. Myc. 26 (1928) 431.

MELIOLA PARENCHYMATICA Gaill.

On *Sapindus* sp. Ann. Myc. 15 (1917) 191.

MELIOLA PERPUSILLA Syd.

On *Tylophora perrottetii.* Ann. Myc. 15 (1917) 191.
On *Tylophora floribunda.* Leafl. Philip. Bot. 9 (1925) 3134.

MELIOLA PIPERINA Syd.

On *Piper* sp. Ann. Myc. 14 (1916) 358; 15 (1917) 191; Leafl. Philip. Bot. 9 (1925) 3134.

MELIOLA POLYTRICHA Kalch. and Cke.

On *Ardisia.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 17—Los Baños (*Baker 3332*).

MELIOLA QUADRISPINA Rac.

On *Merremia umbellata.* Ann. Myc. 15 (1917) 191.

MELIOLA SANDORICI Rehm.

On *Sandoricum koetjape.* Ann. Myc. 15 (1917) 192; Leafl. Philip. Bot. 9 (1925) 3134.

MELIOLA SIDAE Rehm.

On *Sida carpinifolia.* Ann. Myc. 15 (1917) 192.
On *Sida acuta.* Leafl. Philip. Bot. 9 (1925) 3134.

MELIOLA SUBSTENOSPORA v. Hoehn. f. ROTTBOELLIAE Rehm.

On *Rottboellia exaltata.* Leafl. Philip. Bot. 9 (1925) 3134.

MELIOLA TAMARINDI Syd.

On *Tamarindus indica.* Ann. Myc. 15 (1917) 192; Philip. Journ. Sci. 13 (1918) 363.

MELIOLA TELOSMAE Rehm.

On *Telosma* sp. Ann. Myc. 15 (1917) 192.

MELIOLA UNCARIAE Rehm.

On *Uncaria perrottetii.* Ann. Myc. 15 (1917) 193.

PARODIELLA GRAMMODES (Kze.) Cooke.

Australian Fungi (1892) 301.
On *Desmodium triflorum.* Philip. Journ. Sci. 13 (1918) 371.

CAPNODIACEÆ

AITHALODERMA CLAVATISPORUM Syd.

On *Psidium guajava.* BAKER, Philip. Agr. & For. 4 (1914) 163; Phytopath. 9 (1919) 133.
On *Antidesma buniυs.* Philip. Journ. Sci. 12 (1917) 373.
On *Ixora* sp. Ann. Myc. 15 (1917) 179.
On *Chrysophyllum oliviformis.* Ann. Myc. 21 (1923) 97.

CAPNODIUM FOOTII Berk. and Desm.

On *Cocos nucifera.* BAKER, Philip. Agr. & For. 4 (1914) 160; Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 121.

FUMAGO VAGANS Pers.

On *Andropogon sorghum* (*Sorghum vulgare, Holcus sorghum*). Ann. Myc. 15 (1917) 264; Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 138.

LIMACINIA BISEPTATA Sacc.

On *Macaranga* sp. SACCARDO, Ann. Myc. 13 (1915) 127—Los Baños (*Baker 2583*).

LIMACINULA MALLOTI Rehm.

On *Mallotus philippinensis*. Philip. Agr. & For. 4 (1914) 164.

MICROXYPHIUM DUBIUM Sacc.

On *Pinanga*. SACCARDO, Ann. Myc. 13 (1915) 127—Los Baños (*Reyes*, comm. *Baker 81*).

HEMISPHAERIALES

MICROTHYRIACEÆ

ASTERINA BREYNIAE Syd. (Asterina breyniae Yates.)

On *Breynia cernua*. Ann. Myc. 15 (1917) 242; Philip. Journ. Sci. 12 (1917) 370; Ann. Myc. 20 (1922) 71.

ASTERINA CAPPARIDIS Syd. and Butl.

On *Capparis micracantha*. Philip. Journ. Sci. 12 (1917) 370; Ann. Myc. 26 (1928) 439.

On *Capparis horrida*. Ann. Myc. 15 (1917) 243.

On *Capparis irosinensis*. Leafl. Philip. Bot. 9 (1925) 3137.

ASTERINA CASSIAE Syd.

On *Phyllanthus reticulatus*. Ann. Myc. 15 (1917) 245.

On *Cuestis diffusa*. Ann. Myc. 21 (1923) 103.

ASTERINA COLLICULOSA Speg.

On *Eugenia jambolana*. Philip. Journ. Sci. 12 (1917) 370.

ASTERINA DECIPIENS Syd.

On *Champereia manillana*. Ann. Myc. 15 (1917) 245; Philip. Journ. Sci. 13 (1918) 372.

ASTERINA DILLENIAE Syd.

On *Dillenia philippinensis*. Ann. Myc. 15 (1917) 244.

ASTERINA ELMERI Syd.

On *Champereia manillana*. Philip. Journ. Sci. 12 (1917) 370; Ann. Myc. 21 (1923) 103.

On *Champereia cumingiana*. Ann. Myc. 15 (1917) 245.

On *Champereia* sp. Leafl. Philip. Bot. 9 (1925) 3137.

ASTERINA GMELINAE Sacc.

On *Gmelina*. SACCARDO, Nuovo Giorn. Bot. Ital. 23, (1916) 17—Los Baños (*Baker 3763*).

ASTERINA LAWSONIAE P. Henn. and Nym.

On *Lawsonia inermis*. BAKER, Philip. Agr. & For. 4 (1914) 162; Ann. Myc. 15 (1917) 244.

ASTERINA LAXIUSCULA Syd.

On *Sideroxylon* sp. Ann. Myc. 15 (1917) 244.
On *Sideroxylon ferrungineum*. Philip. Journ. Sci. 13 (1918) 372.

ASTERINA LOBATA Syd.

On unknown host. Ann. Myc. 15 (1917) 244.

ASTERINA OPPOSITA Syd.

On *Heynea sumatrana*. Ann. Myc. 15 (1917) 245.

ASTERINA PIPTURI Syd.

On *Pipturus arborescens*. Ann. Myc. 14 (1916) 366; 15 (1917) 245; Leafl. Philip. Bot. 9 (1925) 3137.

ASTERINA PUSILLA Syd.

On *Premna* sp. Ann. Myc. 15 (1917) 244.

ASTERINA SPONIAE Rac.

On *Trema orientalis*. Philip. Journ. Sci. 12 (1917) 370.
On *Trema amboinensis*. Ann. Myc. 15 (1917) 244.
On *Trema* sp. Ann. Myc. 21 (1923) 103; Leafl. Philip. Bot. 9 (1925) 3137.

MORENOELLA MEMECYLI Syd.

On *Memecylon lanceolatum*. Ann. Myc. 15 (1917) 251; Philip. Journ. Sci. 12 (1917) 372.
On *Memecylon subfurfuraceum*. Ann. Myc. 21 (1923) 104.

TRICHOTHYRIUM ORBICULARE Syd.

On *Meliola* sp. Ann. Myc. 15 (1917) 236.
On *Ficus ulmifolia*. Leafl. Philip. Bot. 9 (1925) 3136.

SEYNESIA ALSTONIAE Rehm.

On *Alstonia macrophylla*. Ann. Myc. 16 (1918) 221.

SEYNESIA IPOMOEAE Syd.

On *Merremia* sp. Ann. Myc. 15 (1917) 239.

ASTERINELLA CALAMI Syd.

On *Calamus* sp. Ann. Myc. 15 (1917) 248; Philip. Journ. Sci. 13 (1918) 375.

ASTERINELLA LUZONENSIS Syd.

On *Shorea* sp. Philip. Journ. Sci. 13 (1918) 376.

ASTERINELLA OBESA Syd.

On *Canarium* sp. Ann. Myc. 15 (1917) 247; 21 (1923) 104.

ASTERINELLA STUHLMANNI (Henn.) Theiss.

On *Ananas comosus* (*A. sativus, A. sativas, Ananassa sativa*). BAKER, Philip. Agr. & For. 5 (1916) 73—Los Baños; Ann. Myc. 15 (1917) 247; Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 115; Ann. Myc. 21 (1923) 104.

LEMBOSIA CONGREGATA Syd.

On *Rhododendron schadenbergii.* REHM, Leafl. Philip. Bot. 8 (1915) 2931—Mount Banahao (*A. S. Cruz,* comm. *Baker 2981*).

LEMBOSIA CRUSTACEA (Cke.) Theiss.

COOKE, Grevilea 14 (1915) 13 (*Asterina*); SACCARDO, Syll. Fung. 9 (1891) 380 (*Asterina*); THEISSEN, Ann. Myc. 11 (1891) 432; BAKER, Leafl. Philip. Bot. 6 (1914) 2137 (*Morenoella breviuscula*).

On *Rhododendron schadenbergii.* RHEM, Leafl. Philip. Bot. 8 (1915) 2931—Mount Banahao (*Catalan,* comm. *Baker 2921*).

On *Rhododendron* sp. Ann. Myc. 15 (1917) 249.

LEMBOSIA EUGENIAE Rehm.

On *Eugenia.* REHM, Leafl. Philip. Bot. 8 (1915) 2932—Hills back of Paete, Luzon (*Baker 3137a*).

On *Eugenia calubcub.* Ann. Myc. 15 (1917) 249.

LEMBOSIA JAVANICA (Pat.) Rac.

On *Nipa fruticans.* Philip. Agr. & For. 4 (1914) 163.

LEMBOSIA PANDANI (Rostr.) Theiss.

On *Pandanus.* ROSTRUP (*Asterina pandani*); THEISSEN, Ann. Myc. (1913) 457; Syll. Fung. 17 (1913) 881; REHM, Leafl. Philip. Bot. 8 (1915) 3932—Hills back of Paete (*Baker 3113b*).

On *Pandanus copelandi.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 23—Hills back of Paete (*Baker 3789*).

LEMBOSIA POTHOIDEI Rehm.

On *Pothoideum lobbianum.* Leafl. Philip. Bot. 9 (1925) 3137.

MERRILLIOPELTIS CALAMI P. Henn.

On *Calamus.* REHM, Leafl. Philip. Bot. 8 (1916) 2945—Mount Maquiling (*Baker 2739, 3189*); Philip. Journ. Sci. 12 (1917) 377.

MERRILLIOPELTIS DAEMONOROPSIS Syd.

On *Daemonorops.* REHM, Leafl. Philip. Bot. 8 (1916) 2945—Mount *Maquiling* (*Reyes,* comm. *Baker 3343*).

MERRILLIOPELTIS HOEHNELII Rehm.

On *Dinochloa* and *Arenga saccharifera.* REHM, Leafl. Philip. Bot. 8 (1916) 2945—Mount Maquiling (*Baker 2189*); Los Baños (*Reyes,* comm. *Baker 3371*).

TRICHOTHYRIACEÆ

THEISSEN, Beih. Bot. Centralbl. 32 (1914) 14.

GILLETIELLA LATEMACULANS Rehm.

On *Arenga saccharifera.* Philip. Agr. & For. 4 (1914) 158.

LORANTHOMYCES SORDIDULA (Lev.) v. Hoehn.

On *Loranthus haenkeani.* BAKER, Leafl. Philip. Bot. 6 (1914) 2115; 7 (1914) 2468; Ann. Myc. 15 (1917) 236.

On *Loranthus* sp. Ann. Myc. 21 (1923) 99.

HEMISPHAERIACEÆ

MICROPELTIS AERUGINASCENS Rehm.

On *Rourea erecta*. Ann. Myc. 15 (1917) 231.

DICTYOTHYRIELLA MUCOSA Syd. (Micropeltis mucosa Syd.)

On *Coffea excelsa*. BAKER, Philip. Agr. & For. 5 (1916) 75—Los Baños; Ann. Myc. 14 (1916) 364; Philip. Journ. Sci. 13 (1918) 167; Phytopath. 9 (1919) 122.

MICROTHYRIELLA PHILIPPINENSIS Syd.

On *Lepisanthes schizolepis, Evonymus japonicus, Bauhinia cumingiana*. Ann. Myc. 15 (1917) 235.

MICROTHYRIELLA LATEMACULANS (Rehm) Theiss and Syd.

BAKER, Leafl. Philip. Bot. 7 (1914) 2443 (*Gillettiella*); BAKER, Philip. Agr. & For. 3 (1914) 158; THEISSEN and SYDOW, Ann. Myc. 8 (1915) 254.

MYIOCOPRELLA BAKERI Sacc.

On *Aspidium*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 17—Paete, Laguna Province (*Baker 3829*).

MYIOCOPRON BAKERIANUM Rehm.

On *Passiflora quadrangularis*. BAKER, Philip. Agr. & For. 4 (1914) 163.

MICROPELTELLA CONSIMILIS Rehm.

On *Cryptocarya* sp. Ann. Myc. 15 (1917) 229.

HYPOCREALES

HYPOCREACEÆ

BROOMELLA ZEAE Rehm.

On *Zea mays*. REHM, Leafl. Philip. Bot. 8 (1915) 2923—Los Baños (*Raimundo*, comm. *Baker 1994*); BAKER, Philip. Agr. & For. 5 (1916) 78; Philip. Journ. Sci. 13 (1918) 170; Phytopath. 9 (1919) 140.

MEGALONECTRIA PSEUDOTRICHIA (Schw.) Speg.

On dead bark. Ann. Myc. 15 (1917) 215.

On *Hevea braziliensis*. Philip. Journ. Sci. 13 (1918) 167.

NECTRIACEÆ

CALONECTRIA COPELANDII P. Henn.

On Orchidaceæ. BAKER, Philip. Agr. & For. 4 (1914) 163.

CALONECTRIA SULCATA Starb.

STARBAECK, Bih. K. Svensk. Vet. Ak. Handl. 25 (1899) 29; ZIMMERMANN, Centralbl. Bakter. 7 (1901) 106 (*C. meliae*).

CALONECTRIA HIBISCOLA P. Henn. (Calonectria meliae A. Zimm.)

SACCARDO and SYDOW, Syll. Fung. 16 (1902) 593; SACCARDO, Syll. Fung. 17 (1905) 810 (*C. meliae*); WEESE, Myc. Centralbl. Apr.-May (1914).

On *Ficus pseudopalma*. REHM, Leafl. Philip. Bot. 8 (1915) 2923—Los Baños (*Raimundo*, comm. *Baker 1397b*).

GIBBERELLA SAUBINETII (Mont.) Sacc.

On *Hibiscus esculentus*. BAKER, Philip. Agr. & For. 4 (1914) 161.

On *Panicum* sp. Leafl. Philip. Bot. 9 (1925) 3135.

LISEA REVOCANS Sacc.

On *Imperata cylindrica*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 23—Los Baños (*Baker 3738*); Ann. Myc. 15 (1917) 214.

NECTRIA BAINII Massee.

On *Theobroma cacao*. Philip. Agr. & For. 4 (1915) 164; Phytopath. 9 (1919) 138.

NECTRIA BAINII Massee var. HYPOLEUCA Sacc.

On *Theobroma cacao*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 23—Los Baños (*Baker 3887*); BAKER, Philip. Agr. & For. 5 (1916) 77; Philip. Journ. Sci. 13 (1918) 169.

NECTRIA DISCOPHORA Mont.

MONTAGNE, Syll. gen. sp. Crypt. n. 782 (*Sphaeria*) (1856); SACCARDO, Syll. Fung. 2 (1883) 488; ZIMMERMANN, Centralbl. Bakter. 7 (1901) 106 (*N. striatospora*); SACCARDO and SYDOW, Syll. Fung. 16 (1902) 1140 (*N. striatospora*); WEESE, Gaehrungsphys. 6 (1902) 114–121; DE JONGE, Rec. Trav. Botan. Neerl. 6 (1909) tab. 3, f. 14–17 (*N. striatospora*).

NECTRIA SUBFURFURACEA P. Henn. and Nym.

HENNINGS and NYMANN, Monsunia 1 (1899) 162.

On dead fallen branches. REHM, Leafl. Philip. Bot. 8 (1915) 2922—Mount Maquiling (*Baker 2132*).

NECTRIA TJIBODENSIS Penz. and Sacc. var. GLIRICIDIAE Rehm.

On *Gliricidia sepium*. REHM, Leafl. Philip. Bot. 8 (1915) 2922—Los Baños (*Raimundo*, comm. *Baker 1496*).

OPHIONECTRIA ERINACEA Rehm.

On *Bambusa blumeana*. BAKER, Philip. Agr. & For. 4 (1914) 158.

OPHIONECTRIA THEOBROMAE (Pat.) Duss.

On *Theobroma cacao*. BAKER, Philip. Agr. & For. 4 (1914) 164; 4 (1915) 165; 5 (1916) 77; Philip. Journ. Sci. 13 (1918) 169; Phytopath. 9 (1919) 139.

PARANECTRIA LUXURIANS Rehm.

On *Meliola maesae* and *Panicum*. REHM, Leafl. Philip. Bot. 8 (1915) 2924—Los Baños (*Baker 699b*); (*Eladio Sablan*, comm. *Baker 2882b*); (*Baker 2800*).

TRICHONECTRIA BAMBUSICOLA Rehm.

On *Bambusa*. BAKER, Philip. Agr. & For. 3 (1914) 159.

CLAVICIPTÆ

EPICHLOE WARBURGIANA P. Magn.

On *Donax cannaeformis*. Ann. Myc. 15 (1917) 216.

HYPOCRELLA DISCOIDEA (Berk. and Br.) Sacc.

BERKELEY and BROOME, Journ. Linn. Soc. Bot. 14 (1873) 113 (*Hypocrea*); SACCARDO, Michelia 1 (1873) 322; SACCARDO, Syll. Fung. 2 (1883) 580; MASSEE, Kew Bull. 174 (1899) (*H. zingiberis*); SACCARDO and SYDOW, Syll. Fung. 16 (1902) 603; HENNINGS, Hedwigia (1902) 142 (*H. zimmermanniana*); SACCARDO, Syll. Fung. 17 (1905) 817 (*H. zimmermanniana*); KOORDERS, Bot. Untersuch. (1907) 179 (*H. grewiae*); SACCARDO and TROTTER, Syll. Fung. 22 (1913) 503 (*H. grewiae*); PETCH, Ann., Roy. Bot. Gard. Peradeniya 5 (1914) 526 (*Aschersonia*-stage: *A. samoensis* Henn.).

HYPOCRELLA MOLLII Koord.

KOORDERS, Bot. Untersuch. (1907) 179; v. HOEHNEL, Sitz Kais. Akad. Wiss. Wien 118 (1909) Abth. 1. p. 311 (*H. cretacea*); SACCARDO and TROTTER, Syll. Fung. 22 (1913) 504 (*H. mollii*); 506 (*H. cretacea*); PETCH, Ann. Roy. Bot. Gard. Peradeniya 5 (1914) 526 (*Aschersonia*-stage; *A. confluens* Henn.).

HYPOCRELLA RECIBORSKII A. Zimm.

ZIMMERMANN, Centralbl. f. Bakt. 7 (1901) 875; HENNINGS, Engler's Bot. Jahrb. 38 (1905) 13 (*H. warneckiana*); SACCARDO, Syll. Fung. 17 (1905) 818; RACIBORSKI, Bull. Akad. Sci. Cracovie (1906) 909 (*Barya salaccensis*); BAKER, Leafl. Philip. Bot. 6 (1914) 2100; 7 (1914) 2451 (*H. salaccensis*); PETCH, Ann. Roy. Bot. Gard. Peradeniya 5 (1914) 527.

HYPOCRELLA REINECKIANA P. Henn.

HENNINGS, Engler's Bot. Jahrb. 23 (1896) 286; PATOUILLARD, Ann. Bot. Jard. Buitenzorg Suppl. 1 (1897) 125 (*H. pernettyae*); RACIBORSKI, Bull. Acad. Sci. Cracovie (1906) 907 (*H. globosa*); BAKER, Leafl. Philip. Bot. 7 (1914) 2451 (*H. pernettiae*); PETCH, Ann. Roy. Bot. Gard. Peradeniya 5 (1914) 524 (*Aschersonia*-stage; *A. sclerotoides* Henn.).

HYPOCRELLA SALACCENSIS (Rac.) Petch.

On *Premna odorata*. Ann. Myc. 15 (1917) 215.

HYPOCRELLA SCHIZOSTACHYII P. Henn.

On *Schizostachyum*. Philip. Journ. Sci. 13 (1918) 376.

OPHIODOTHIS THANATOSPORA (Lev.) Rac.

LEVEILLE, Ann. Sci. Nat. No. 248 (*Dothidea*) (1845); RACIBORSKI, Bull. Sci. Ak. Crac. (1906) 904.

On *Centotheca latifolia*. REHM, Leafl. Philip. Bot. 8 (1915) 2924—Mount Maquiling (*Baker 2219*).

USTILAGINOIDEA OCHRACEA P. Henn.

On *Panicum* sp. Leafl. Philip. Bot. 9 (1925) 3138.

USTILAGINOIDEA VIRENS (Cke.) Takahashi.

On *Oryza sativa*. BAKER, Philip. Agr. & For. 4 (1914) 163; 5 (1916) 75; Ann. Myc. 15 (1917) 217; Philip. Journ. Sci. 13 (1918) 168, 376; Phytopath. 9 (1919) 130; Philip. Agr. Rev. 19 (1926) 240.

DOTHIDEALES

DOTHIDIACEÆ

AUERSWALDIA EXAMINANS (Mont. and Berk.) Sacc.

MONTAGNE and BERKELEY, Lond. Journ. Bot. 1 (1842) 156 (*Sphaeria*); Pl. Javan. (1842) 520 (*Dothidea*); COOKE, Grevilea 13 (1842) 61; Philip. Agr. & For. 4 (1914) 158; BAKER, Leafl. Philip. Bot. 6 (1914) 2101; Leafl. Philip. Bot. 7 (1914) 2452; THEISSEN and SYDOW, Ann. Myc. 13 (1915) 298.

On *Hevea brasiliensis*. Ann. Myc. 21 (1923) 102.

AUERSWALDIA GIGANTOCHLOAE Rehm.

THEISSEN and SYDOW, Ann. Myc. 13 (1915) 301.

BALANSIA CLAVICEPS Speg.

On *Centotheca latifolia*. Ann. Myc. 15 (1917) 216.

DOTHIDELLA GIGANTOCHLOAE (Rehm) Theiss. and Syd.

On *Gigantochloa scribneriana*. REHM, Leafl. Philip. Bot. 6 (1914) 2223 (*Scirrhia*); BAKER, Leafl. Philip. Bot. 7 (1914) 2462 (*Scirrhia*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 320; 15 (1917) 223.

ELMEROCOCCUM ORBICULA Syd.

BAKER, Leafl. Philip. Bot. 6 (1914) 2102 (*Darwiniella*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 282.

HETERODOTHIS LEPTOTHECA Syd.

SYDOW, Philip. Journ. Sci. § C 9 (1914) 170; BAKER, Leafl. Philip. Bot. 7 (1914) 2454; THEISSEN and SYDOW, Ann. Myc. 13 (1915) 190 is a lichen and = *Phylloporina phyllogena* Muell.-Arg.

PSEUDOTHIS PTEROCARPI Syd.

BAKER, Leafl. Philip. Bot. 6 (1914) 2102 (*Dothidea*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 339.

POLYSTOMELLACEÆ

AULACOSTROMA PALAWANENSE Syd.

On *Pandanus tectorius*. BAKER, Leafl. Philip. Bot. 7 (1914) 2453; THEISSEN and SYDOW, Ann. Myc. 13 (1915) 256; 15 (1917) 223.

ELLISIODOTHIS PANDANI Syd.

On *Pandanus luzonensis.* SYDOW, Ann. Myc. (1914) 565—Angat, Bulacan Province; THEISSEN and SYDOW, Ann. Myc. 13 (1915) 247.

ELLISIODOTHIS REHMIANA Theiss. and Syd.

On *Dioscorea esculenta.* BAKER, Leafl. Philip. Bot. 7 (1914) 2460 (*Phyllachora*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 248; Philip. Journ. Sci. 13 (1918) 167.

HYSTEROSTOMELLA LETRACERAE (Rud.) v. Hoehnel.

RUD., Linnaea 4 (1829) 118 (*Phacidium*); 5 (1830) 551 (*Phacidium*); SACCARDO, Syll. Fung. 8 (1889) 748 (*Coccomyces*); ELLIS and EVERHART, Journ. Myc. 10 (1904) 167 (*Harknessia*); BAKER, Leafl. Philip. Bot. 7 (1914) 2497; THEISSEN and SYDOW, Ann. Myc. 13 (1915) 224.

HYSTEROSTOMELLA SPURCARIA (Berk. and Br.) v. Hoehn.

BERKELEY and BROOME, Fung. Ceyl. (1870) No. 1131 (*Rhytisma spurcarium*); No. 1132 (*Rhytisma constellatum*); BERKELEY and CURTIS, Journ. Linn. Soc. Bot. 14 (1873) 131 (*Rhytisma*); SACCARDO, Syll. Fung. 8 (1899) 737 (*Marchalia*); v. HOEHNEL, Fragm. Myc. 9 (1899) 56.

On *Artocarpus communis.* REHM, Leafl. Philip. Bot. 8 (1915) 2932—Los Baños (*Baker 2393*); (*Reyes,* comm. *Baker 2557*).

HYSTEROSTOMELLA TETRACERAE (Rud.) v. Hoehn.

On *Tetracera* sp. Ann. Myc. 15 (1917) 220.

INOCYCLUS PSYCHOTRIAE Syd.

BAKER, Leafl. Philip. Bot. 6 (1914) 2136; 7 (1914) 2497 (*Hysterostomella*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 211.

On *Psychotria luzoniensis.* Philip. Journ. Sci. 12 (1917) 373; Ann. Myc. 15 (1917) 220.

MARCHALIA CONSTELLATA (Berk. and Br.) Sacc.

BERKELEY and BROOME, Journ. Linn. Soc. Bot. 14 (1875) 131 (*Rhytisma constellatum* and *R. spurcarium*); v. HOEHNEL, Fragm. Myc. 9 (1875) No. 448 (*Hysterostomella*); SACCARDO, Syll. Fung. 8 (1899) 737 (*Marchalia spurcaria*).

On *Artocarpus.* THEISSEN and SYDOW, Ann. Myc. 13 (1915) 251—Philippines, Exsicc.: *Sydow, Fung. Exot. 403.*

On *Artocarpus communis.* Philip. Journ. Sci. 13 (1918) 165.

MICRODOTHELLA CULMICOLA Syd.

BAKER, Leafl. Philip. Bot. 7 (1914) 2454; THEISSEN and SYDOW, Ann. Myc. 13 (1915) 259.

PALAWANIA COCOES Syd.

On *Cocos nucifera.* Philip. Agr. & For. 4 (1914) 160; BAKER, Leafl. Philip. Bot. 7 (1914) 2454; THEISSEN and SYDOW, Ann. Myc. 13 (1915) 250; Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 122.

PALAWANIA GRANDIS (Niessl.) Syd.

NIESSL., in Rabh. Fung. Eur. No. 2467 (*Microthyrium*); WINTER, Hedwigia (1886) 107 (*Seynesia*); HENNINGS and E. NYM., (1899) 160 (*Seynesia calamicola*); SACCARDO and SYDOW, Syll. Fung. 16 (1902) 641 (*Seynesia calamicola*); BAKER, Leafl. Philip. Bot. 7 (1914) 2454; THEISSEN and SYDOW, Ann. Myc. 13 (1915) 249.

RHIPIDOCARPON JAVANICUM (Pat.) Theiss. and Syd.

PATOUILLARD, Ann. Jard. Buit. Suppl. (1897) 122 (*Schneepia*); RACIBORSKI, Paras. Alg. und Pilze Javas 2 (1900) 20; (*Lembosia*); SACCARDO and SYDOW, Syll. Fung. 14 (1899) 709 (*Parmularia*); THEISSEN, Ann. Myc. 11 (1912) 453; BAKER, Philip. Agr. & For. 3 (1914) 163 (*Lembosia*); BAKER, Leafl. Philip. Bot. 6 (1914) 2138; 7 (1914) 2441 (*Lembosia*); THEISSEN and SYDOW, Ann. Myc. 13 (1914) 197.

On *Nipa fruticans*. REHM, Leafl. Philip. Bot. 8 (1915) 2933—Los Baños (*Reyes*, comm. *Baker 2548; Mirasol*, comm. *Baker 1220; Catalan*, comm. *Baker 2839*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 197 Exsicc.: *Rehm, Ascom. 1839* (Java); *Sydow, Fung. Exot. 268* (Philippines).

On *Psychotria lusoniensis*. Ann. Myc. 15 (1917) 220.

SCHNEEPIA HYMENOLEPIDIS (P. Henn.) Theiss. and Syd.

BAKER, Leafl. Philip. Bot. 6 (1914) 2137; 7: 2445 (*Parmularia*); SYDOW, Ann. Myc. 13 (1915) 204.

STIGMATODOTHIS PALAWANENSIS Syd.

BAKER, Leafl. Philip. Bot. 7 (1914) 2463; THEISSEN and SYDOW, Ann. Myc. 13 (1915) 264.

ULEOPELTIS BAMBUSINA Syd.

On *Bambusa*. SYDOW, Ann. Myc. 12 (1914) 565—Angat, Bulacan Province; THEISSEN and SYDOW, Ann. Myc. 13 (1915) 218.

PHYLLACHORACEÆ

APIOSPORA APIOSPORA (Dur. and Mtg.) v. Hoehn.

DURAND and MONTAGNE, Crypt. Alger. tab. 1: 492 (*Sphaeria*); MONTAGNE, Syll. Crypt (1856) No. 809 (*Sphaeria*); SACCARDO, Fung. Ven. Ser. 2 (1874) 306 (*A. montagnei*); SACCARDO, Syll. Fung. 1 (1882) 539 (*A. montagnei*); BAKER, Leafl. Philip. Bot. 6 (1914) 2111 (excl. syn. *A. luzonensis*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 419 (*Apiospora montagnei*).

On *Bambusa vulgaris*. REHM, Leafl. Philip. Bot. 8 (1916) 2946—Los Baños (*Reyes*, comm. *Baker 1895, 1435*).

On *Bambusa* sp. Ann. Myc. 16 (1918) 223.

APIOSPORA CAMPTOSPORA Penz. and Sacc.

BAKER, Leafl. Philip. Bot. 7 (1914) 2463; THEISSEN and SYDOW, Ann. Myc. 13 (1915) 421; 15 (1917) 225.

On *Saccharum officinarum*. Philip. Agr. & For. 5 (1916) 343; Philip. Journ. Sci. 13 (1918) 169; Philip. Agr. Rev. 2 (1918) 276; Phytopath. 9 (1919) 136.

APIOSPORA CARBONACEA Rehm.

On *Schizostachyum.* REHM, Leafl. Philip. Bot. 8 (1916) 2945—Mount Maquiling (*Baker 3427a*); Leafl. Philip. Bot. 8 (1915) 2945.

APIOSPORA LUZONENSIS P. Henn.

On *Bambusa.* BAKER, Leafl. Philip. Bot. 6 (1914) 2113 (sub *Apiospora apiospora*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 421; 15 (1917) 225.

CATACAUMA APOENSE (Syd.) Theiss. and Syd.

On *Ficus nervosa.* BAKER, Leafl. Philip. Bot. 6 (1914) 2103 (*Phyllachora*); 7: 2455 (*Phyllachora*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 2455; 15 (1917) 224.

CATACAUMA ASPIDEUM (Berk.) Theiss. and Syd. f. SPINIFERA (Karst. and Har.) Theiss. and Syd.

BAKER, Leafl. Philip. Bot. 6 (1914) 2106 (*Phyllachora fici-minahassae*); 2110 (*Phyllachora spinifera*); 7: 2457 (*Phyllachora fici-minahassae*); 2460 (*Phyllachora spinifera*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 380.

On *Ficus odorata* (*F. odoratus*). Ann. Myc. 15 (1917) 224; Philip. Journ. Sci. 12 (1917) 374; Ann. Myc. 16 (1918) 215; 21 (1923) 101.

On *Ficus validicaudata.* Philip. Journ. Sci. 13 (1918) 376.

CATACAUMA ASPIDEUM (Berk.) Theiss. and Syd. f. FICIFULVAE (Koord.) Theiss. and Syd.

KOORDERS, Verh. K. Akad. Wet. Amsterdam 2 (1907) 183 No. 4; BAKER, Leafl. Philip. Bot. 6 (1914) 2105 (*Phyllachora fici-fulvae*); 7: 2457 (*Phyllachora fici-fulvae*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 381.

On *Ficus* sp. Philip. Journ. Sci. 12 (1917) 374.

On *Ficus odorata* (*F. odoratus*). Ann. Myc. 15 (1917) 224.

CATACAUMA CIRCINATUM (Syd.) Theiss. and Syd.

BAKER, Leafl. Philip. Bot. 6 (1914) 2104 (*Phyllachora*); 7 (1914) 2455 (*Phyllachora*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 2456.

CATACAUMA ELMERI (Syd.) Theiss. and Syd.

BAKER, Leafl. Philip. Bot. 6 (1914) 2105 (*Phyllachora*); 7: 2457 (*Phyllachora*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 378.

On *Ficus* sp. Philip. Journ. Sci. 12 (1917) 375.

On *Ficus minehassa.* Ann. Myc. 15 (1917) 224.

CATACAUMA EURYAE (Rac.) Theiss. and Syd.

RACIBORSKI, Bull. Acad. Cracov. (1909) 377 (*Myocopron*); v. HÖEHNEL, Fragm. Myc. 7 (1912) No. 305 (*Physalospora*); BAKER, Leafl. Philip. Bot. 6 (1914) 2122 (*Physalospora*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 392.

CATACAUMA GARCIAE Theiss. and Syd.

On *Ficus garcia.* THEISSEN and SYDOW, Ann. Myc. 13 (1915) 381—Puerto Princesa, Palawan (*Elmer 12847*).

On *Ficus* sp. Leafl. Philip. Bot. 9 (1925) 3136.

CATACAUMA INFECTORIUM (Cke.) Theiss. and Syd.

BAKER, Leafl. Philip. Bot. 6 (1914) 2106 (*Phyllachora*); 7 (1914) 2458 (*Phyllachora*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 384.

CATACAUMA KAERNBACHII (P. Henn.) Theiss. and Syd.

HENNINGS, Engl. Bot. Jahrb. 18 Beibl. 44 (1894) 39 (*Phyllachora*); Syll. Fung. 11: 372 (*Phyllachora*); BAKER, Leafl. Philip. Bot. 6 (1914) 2107 (*Phyllachora*); 7 (1914) 2458 (*Phyllachora*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 376.

CATACAUMA LAGUNENSE (Syd.) Theiss. and Syd.

On *Ficus* sp. BAKER, Leafl. Philip. Bot. 6 (1914) 2107 (*Phyllachora*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 378; 15 (1917) 224; Philip. Journ. Sci. 12 (1917) 374.

On *Ficus hauili*. Ann. Myc. 21 (1923) 101.

CATACAUMA PTEROCARPI (Syd.) Theiss. and Syd.

On *Pterocarpus angalensis*. SYDOW, Ann. Myc. (1912) 40—South Africa; BAKER, Leafl. Philip. Bot. 6 (1914) 2109 (*Phyllachora pterocarpi* non Rehm); 7 (1914) 2459 (*Phyllachora pterocarpi* non Rehm); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 387.

On *Pterocarpus indicus*. Ann. Myc. 15 (1917) 223.

CATACAUMA SANGUINEUM (Rehm) Theiss. and Syd.

On *Ficus heterophylla*. BAKER, Leafl. Philip. Bot. 7 (1914) 2456 (*Phyllachora circinata* var. *sanguinea*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 379; 15 (1917) 224.

CATACAUMA VALSIFORME (Rehm) Theiss. and Syd.

BAKER, Leafl. Philip. Bot. 6 (1914) 2110 (*Phyllachora*); 7 (1914) 2461 (*Phyllachora*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 379.

EXARMIDIUM BLUMEANUM (Rehm) Theiss. and Syd.

BAKER, Leafl. Philip. Bot. 6 (1914) 2110 (*Rhopographus*); 7 (1914) 2462 (*Rhopographus*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 425.

MUNKIODOTHIS MELASTOMATA (v. Hoehn.) Theiss. and Syd.

On *Melastoma fusca*. BAKER, Leafl. Philip. Bot. 6 (1914) 2103 (*Munkiella*); 7 (1914) 2454 (*Munkiella*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 360; 15 (1917) 223.

PHYLLACHORA AFZELIAE Syd.

On *Afzelia bijuga*. Philip. Agr. & For. 4 (1914) 163.

PHYLLACHORA CANARI P. Henn.

On *Canarium villosum*. Philip. Journ. Sci. 12 (1917) 375; Ann. Myc. 16 (1918) 214.

On *Canarium* sp. Leafl. Philip. Bot. 9 (1925) 3136.

PHYLLACHORA COICIS P. Henn.

On *Coix lachryma-jobi*. Philip. Journ. Sci. 12 (1917) 375.

PHYLLACHORA CYNODONTIS (Sacc.) Niessl.

On *Cynodons dactylis.* Ann. Myc. 15 (1917) 227; 26 (1928) 438.

PHYLLACHORA DALBERGIAE Niessl.

On *Dalbergia* sp. Philip. Journ. Sci. 12 (1917) 375.

PHYLLACHORA DIOSCOREA Schwein.

On *Dioscorea* sp. BAKER, Philip. Agr. & For. 4 (1914) 161; Phytopath. 9 (1919) 124.

On *Dioscorea esculenta.* Philip. Journ. Sci. 13 (1918) 167.

PHYLLACHORA LUZONIENSIS P. Henn.

On *Milletia.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 23—Mount Maquiling (*Baker 3840*); Philip. Journ. Sci. 12 (1917) 375; Ann. Myc. 21 (1923) 102.

On *Milletia cavitensis.* Ann. Myc. 15 (1917) 225.

PHYLLACHORA MINUTISSIMA (Welw. and Curr.) Sm.

On *Pennisetum.* WELWITSCH and CURR., Trans. Linn. Soc. Bot. (1868) 285 (*Isothea*)—Angola; SMITH, Journ. Bot. (1898) 179; SACCARDO and SYDOW, Syll. Fung. 16 (1902) 623.

PHYLLACHORA ORBICULA Rehm.

On *Bambusa blumeana.* Philip. Agr. & For. 4 (1914) 158; Ann. Myc. 15 (1917) 227; 16 (1918) 223.

PHYLLACHORA PAHUDIAE Syd.

On *Pahudia rhomboidea.* Ann. Myc. 15 (1917) 225.

PHYLLACHORA PARKIAE P. Henn.

On *Parkia timoriana.* Philip. Agr. & For. 4 (1914) 163.

On *Parkia javanica.* Ann. Myc. 26 (1928) 438.

PHYLLACHORA PHASEOLINA Syd.

BAKER, Philip. Agr. & For. 4 (1914) 163.

On *Phaseolus* sp. Ann. Myc. 15 (1917) 225; Philip. Journ. Sci. 13 (1918) 168.

On *Phaseolus calcaratus.* Phytopath. 9 (1919) 132.

PHYLLACHORA PONGAMIAE (Berk. and Br.) Petch.

On *Pongamia glabra.* Philip. Agr. & For. 4 (1914) 163.

On *Pongamia pinnata.* Philip. Journ. Sci. 12 (1917) 375; Ann. Myc. 21 (1923) 102; 26 (1928) 437.

On *Pongamia mitis.* Ann. Myc. 15 (1917) 225.

PHYLLACHORA REHMIANA Theiss. and Syd.

On *Dioscorea esculenta.* Philip. Journ. Sci. 13 (1918) 167.

PHYLLACHORA ROTTBOELLIAE Syd. and Butl.

On *Rottboellia exaltata.* Leafl. Philip. Bot. 9 (1925) 3136; Ann. Myc. 26 (1928) 438.

PHYLLACHORA ROUREAE Syd.

On *Rourea erecta.* Ann. Myc. 15 (1917) 226.

PHYLLACHORA SACCHARI P. Henn.

On *Saccharum officinarum.* Philip. Agr. & For. 5 (1916) 343; Philip. Agr. Rev. 11 (1918) 275; Philip. Journ. Sci. 13 (1918) 169; Phytopath. 9 (1919) 134; Philip. Agr. Rev. 14 (1921) 430.

PHYLLACHORA SACCHARI-SPONTANEI Syd.

On *Saccharum spontaneum.* Ann. Myc. 15 (1917) 226; Philip. Journ. Sci. 13 (1918) 169; Phytopath. 9 (1919) 134.

PHYLLACHORA SORGHI v. Hoehnel.

On *Andropogon halepensis* (*Sorghum halepensis*) var. *propinquus.* Ann. Myc. 15 (1917) 226; Philip. Journ. Sci. 13 (1918) 377.

On *Andropogon sorghum* (*Sorghum vulgare, Holcus sorghum, Sorghum* sp.). Philip. Journ. Sci. 13 (1918) 165; Ann. Myc. 16 (1918) 214; Phytopath. 9 (1919) 137; Leafl. Philip. Bot. 9 (1925) 3136.

PHYLLACHORA TJANKORREH Rac.

On *Dinochloa* sp. Ann. Myc. 15 (1917) 228.

On *Schizostachyum rotundifolium.* Ann. Myc. 21 (1923) 102.

PHYLLACHORA YAPENSIS (P. Henn.) Syd.

On *Derris elliptica.* Philip. Journ. Sci. 12 (1917) 375.

On *Derris* sp. Ann. Myc. 15 (1917) 225; Leafl. Philip. Bot. 9 (1925) 3136.

RHOPOGRAPHELLA REYESIANA Rehm.

On *Schizostachyum* sp. Ann. Myc. 15 (1917) 209.

PLACOSTROMA PTEROCARPI (Mass.) Theiss. and Syd.

MASSEE, Kew Bull. (1912) 257 (*Dothidella*); BAKER, Leafl. Philip. Bot 6 (1914) 2109 (*Phyllachora pterocarpi* Rehm non Syd.); 7 (1914) 2459 (*Phyllachora pterocarpi* Rehm non Syd.); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 407.

SCHIZOCHORA ELMERI Syd.

BAKER, Leafl. Philip. Bot. 7 (1914) 2462; THEISSEN and SYDOW, Ann. Myc. 13 (1915) 401.

SCIRRHIA BAMBUSINA Penz. and Sacc.

On *Bambusa blumeana.*

SCIRRHIA LUZONENSIS P. Henn.

On *Bambusa blumeana.* Philip. Agr. & For. 4 (1914) 158; BAKER, Leafl. Philip. Bot. 6 (1914) 2111; 7 (1914) 2462; THEISSEN and SYDOW, Ann. Myc. 13 (1915) 418.

SCIRRHODOTHIS BAMBUSINA (Penz. and Sacc.) Theiss. and Syd.

On *Schizostachyum acutiflorum.* BAKER, Leafl. Philip. Bot. 6 (1914) 2111 (*Scirrhia*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 416; SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 23 (*Baker 3822*).

SCIRRHODOTHIS SERIATA Syd. and Butl.

BAKER, Leafl. Philip. Bot. 6 (1914) 2111 (*Scirrhia*); 7: 2463 (*Scirrhia*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 416.

APHERODOTHIS ARENGAE (Rac.) Shear.

On *Caryota rumphiana* var. *philippinensis*. Ann. Myc. 15 (1917) 228; Philip. Journ. Sci. 12 (1917) 375; Leafl. Philip. Bot. 9 (1925) 3136.

TRABUTIA ELMERI Theiss. and Syd.

On *Ficus banahaensis*. THEISSEN and SYDOW, Ann. Mycol. 13 (1915) 353—Mount Apo, Mindanao (*Elmer 10906*).

TRABUTIA FICUUM (Niessl.) Theiss. and Syd.

BAKER, Leafl. Philip. Bot. 6 (1914) 2106 (*Phyllachora ficuum*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 352.

TRABUTIA VERNICOSA Theiss. and Syd.

On *Ficus heterophylla*. THEISSEN and SYDOW, Ann. Myc. 13 (1915) 353—Mindoro (*Merrill 5625*).

SPHAERIALES

SORDARIACEÆ

SORDARIA ORYZETI Sacc.

On *Oryza sativa*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 19—Los Baños (*Baker 3807*); BAKER, Philip. Agr. & For. 5 (1916) 76; Philip. Journ. Sci. 13 (1918) 168; Phytopath. 9 (1919) 131.

SPHAERIACEÆ

ACANTHOSTIGMA BAMBUSAE v. Hoehn.

V. HOEHNEL, Wiss. Wein. 18: 334.

On *Bambusa blumeana*. REHM, Leafl. Philip. Bot. 8 (1916) 3951—Los Baños (*Baker 2187*); Mount Maquiling (*Baker 3535*).

ACERBIA MAYDIS Rehm.

On *Zea mays*. REHM, Leafl. Philip. Bot. 8 (1916) 2953—Los Baños (*Raimundo*, comm. *Baker 1993*); BAKER, Philip. Agr. & For. 5 (1916) 78; Philip. Journ. Sci. 13 (1918) 170; Phytopath. 9 (1919) 140.

CHAETOSPHAERIA EXIMIA Sacc.

On *Cocos nucifera*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 20—Los Baños (*Baker 3758*); Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 122.

LASIOSPHAERIA MOLLIS Rehm.

On *Bambusa blumeana*. REHM, Leafl. Philip. Bot. 8 (1916) 2952—Los Baños (*Reyes*, comm. *Baker 1734*).

MELANOMMA MINDORENSE Rehm.

On *Arenga saccharifera*. REHM, Leafl. Philip. Bot. 6 (1914) 2202 (*Metasphaeria maculans*); 8 (1916) 2950—Los Baños (*Baker 1876*).

MELANOPSAMMA LICHENOIDES Rehm.

On fallen limbs. REHM, Leafl. Philip. Bot. 8 (1916) 2944—Los Baños (*Baker 3067a*).

NEOPECKIA RHODOSTICTA (B. and Br.) Sacc.

On *Pandanus*. SACCARDO, Syll. Fung. 2 (1883) 213 (*Herpotrichia*); BERLESE, Atti Congr. Bot. Genova (1892) 5 (*Didymotrichia*); REHM, Leafl. Philip. Bot. 8 (1916) 2946—Los Baños (*Reyes*, comm. *Baker 3440*).

NEOPECKIA RHODOSTICTA (Berk. and Br.) Sacc. var. MAGNIFICA Rehm.

On *Pandanus sabutan*. REHM, Leafl. Philip. Bot. 8 (1916) 2947—Los Baños (*Reyes*, comm. *Baker 3047*).

ROSELLINIA BUNODES (Berk. and Br.) Sacc.

BERKELEY and BROOME, Fung. Ceylon (1870) No. 1088 (*Sphaeria*); SACCARDO, Syll. Fung. 1 (1882) 254.

On fallen limbs. REHM, Leafl. Philip. Bot. 8 (1916) 2941—Los Baños (*Reyes*, comm. *Baker*); Ann. Myc. 15 (1917) 211.

ROSELLINIA CALAMI P. Henn.

On *Bambusa blumeana*. Ann. Myc. 15 (1917) 211.

ROSELLINIA COCOES P. Henn.

On *Arenga mindorensis*. Ann. Myc. 15 (1917) 211.

On *Cocos nucifera*. Philip. Journ. Sci. 13 (1918) 167; Phytopath. 9 (1919) 122.

ROSELLINIA (TASSIELLA) CRUSTACEA Rehm.

On *Schizostachyum*. REHM, Leafl. Philip. Bot. 8 (1916) 2941—Los Baños (*Reyes*, comm. *Baker 3372*).

ROSELLINIA DECIPIENS (Rehm) Theiss. and Syd.

BAKER, Leafl. Philip. Bot. 6 (1914) 2101 (*Auerswaldia*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 300.

ROSELLINIA (TASSIELLA) HORRIDA Rehm.

On dead bark. REHM, Leafl. Philip. Bot. 8 (1916) 2941—Mount Maquiling (*Baker 2909*).

ROSELLINIA LAMIPROSTOMA Syd.

On *Streblus asper* and on dead *Daemonorops*. REHM, Leafl. Philip. Bot. 8 (1916) 2942—Los Baños (*Raimundo*, comm. *Baker 2975*); Mount Maquiling (*Baker 2720*).

ROSELLINIA (CONIMELA) MAQUILINGIANA Rehm.

On fallen limbs. REHM, Leafl. Philip. Bot. 8 (1916) 2942—Mount Maquiling (*Reyes*, comm. *Baker 3347*).

ROSELLINIA MEGALOSPERMA Syd.

On *Pipturus arborescens*. Ann. Myc. 15 (1917) 211.

ROSELLINIA MERRILLII Syd.

On decorticated wood. Ann. Myc. 15 (1917) 211.

ROSELLINIA MOLLERIANA Henn.

HENNINGS, Hedwigia 13 (1902).

On decorticated wood. REHM, Leafl. Philip. Bot. 8 (1916) 2942—Mount Maquiling (*Baker 4026*).

ROSELLINIA PROCERA Syd.

On *Alchornea rugosa*. REHM, Leafl. Philip. Bot. 8 (1916) 2942—Los Baños (*Baker 4024*).

ROSELLINIA UMBILICATA Sacc.

On bark. Ann. Myc. 15 (1917) 211.

ZIGNOELLA (TREMATOSTOMA) NOBILIS Rehm.

On *Citrus nobilis*. REHM, Leafl. Philip. Bot. 8 (1916) 2950—Los Baños (*Baker 3229*); BAKER, Philip. Agr. & For. 5 (1916) 74; Phytopath. 9 (1919) 119; REINKING, Philip. Agr. 9 (1920–21) 133; Leafl. Philip. Bot. 8 (1915) 2950; Philip. Journ. Sci. 13 (1918) 166.

CUCURBITARIACEÆ

GIBBERA PHILIPPINENSIS Rehm.

On *Schizostachyum*. REHM, Leafl. Philip. Bot. 8 (1916) 2946—Mount Maquiling (*Baker 2896*).

NITSCHKEA BAMBUSARUM Rehm.

On *Bambusa vulgaris*. REHM, Leafl. Philip. Bot. 8 (1916) 2956—Los Baños (*Reyes*, comm. *Baker 1884, 1886*).

CORYNELIACEÆ

CORYNELIA CLAVATA (L.) Sacc.

On *Podocarpus*. REHM, Leafl. Philip. Bot. 8 (1915) 2925—Mount Banahao (*Copeland*, comm. *Baker 3639*).

On *Podocarpus costatus*. Ann. Myc. 15 (1917) 178.

TRICHOSPHAERIA BAMBUSICOLA Rehm.

On *Bambusa blumeana*. Philip. Agr. & For. 4 (1914) 158.

AMPHISPHAERIACEÆ

AMPHISPHAERIA ARENGAE Rehm.

On *Arenga*. REHM, Leafl. Philip. Bot. 8 (1916) 2947—Los Baños (*Reyes*, comm. *Baker 3436*).

AMPHISPHAERIA SCHIZOSTACHYI Rehm.

On *Schizostachyum*. REHM, Leafl. Philip. Bot. 8 (1916) 2947—Los Baños (*Baker 1966*).

TREMATOSPHAERIA MAQUILINGIANA Rehm.

On *Calamus*. REHM, Leafl. Philip. Bot. 8 (1916) 2952—Mount Maquiling (*Baker 3420*).

TREMATOSPHAERIA MAQUILINGIANA Rehm var. SCHIZOSTACHYI Rehm.

On *Schizostachyum*. REHM, Leafl. Philip. Bot. 8 (1916) 2952—Mount Maquiling (*Baker 3426*).

MYCOSPHAERELLACEÆ

ASCOSPORA VANILLAE Rehm.

On *Vanilla* sp. REHM, Leafl. Philip. Bot. 8 (1916) 2935—Los Baños (*Baker 3079*).

GUIGNARDIA ARENGAE Rehm.

On *Caryota* sp. Ann. Myc. 15 (1917) 207.

GUIGNARDIA BAMBUSINA Rehm.

On *Bambusa*. REHM, Leafl. Philip. Bot. 8 (1916) 2936—Los Baños (*Baker 1898, 1915a*).

GUIGNARDIA CREBERRIMA Syd.

On *Capparis horrida*. Philip. Journ. Sci. 12 (1917) 376; Ann. Myc. 15 (1917) 207; Philip. Journ. Sci. 13 (1918) 377.

GUIGNARDIA DINOCHLOAE Rehm.

On *Dinochloa*. REHM, Leafl. Philip. Bot. 8 (1916) 2936—Mount Maquiling (*Baker 2189b*).

GUIGNARDIA MANIHOTI Sacc.

On *Manihot utilissima*. BAKER, Philip. Agr. & For. 3 (1914) 162; Philip. Journ. Sci. 13 (1918) 168; Phytopath. 9 (1919) 128.

GUIGNARDIA MANIHOTI Sacc. var. DIMINUTA Sacc.

On *Manihot utilissima*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 18; Philip. Journ. Sci. 13 (1918) 168.

MASSALONGIELLA IMPERATAE Rehm.

On *Imperata cylindrica*. REHM, Leafl. Philip. Bot. 8 (1916) 2956—Los Baños (*Reyes*, comm. *Baker 3120*).

MYCOSPHAERELLA ALOCASIAE Syd.

On *Alocasia indica*. BAKER, Philip. Agr. & For. 3 (1914) 158; Ann. Myc. 15 (1917) 205.

MYCOSPHAERELLA ARISTOLOCHIAE Syd.

Ann. Myc. 15 (1917) 205; Philip. Journ. Sci. 13 (1918) 377; Leafl. Philip. Bot. 9 (1925) 3135.

MYCOSPHAERELLA BRIDELIAE Syd.

On *Bridelia stipularis*. Ann. Myc. 15 (1917) 206.

MYCOSPHAERELLA CARICAE Syd.

On *Carica papaya*. BAKER, Philip. Agr. & For. 3 (1914) 159; Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 118.

MYCOSPHAERELLA MUSAE Speg.

On *Musa cavendishii*. BAKER, Philip. Agr. & For. 3 (1914) 162; Ann. Myc. 15 (1917) 206.

On *Musa sapientum*. Philip. Journ. Sci. 13 (1918) 168; Ann. Myc. 21 (1923) 100; Philip. Agr. Rev. 18 (1925) 582.

On *Musa paradisiaca sapientum*. Phytopath. 9 (1919) 129.

On *Musa textilis*. Philip. Journ. Sci. 13 (1918) 168; Phytopath. 9 (1919) 129.

MYCOSPHAERELLA OCULATA Syd.

On *Premna* sp. Ann. Myc. 15 (1917) 206.

On *Premna odorata*. Philip. Journ. Sci. 13 (1918) 377.

MYCOSPHAERELLA PERICAMPYLI Syd.

On *Pericampylus incanus.* Ann. Myc. 15 (1917) 206; 21 (1923) 99; Leafl. Philip. Bot. 9 (1925) 3135.

MYCOSPHAERELLA REYESII Syd.

On *Sapindus saponaria.* BAKER, Philip. Agr. & For. 4 (1914) 164; Ann. Myc. 15 (1917) 207.

SPHAERULINA SMILACINCOLA Rehm.

Ann. Myc. 20 (1922) 70.

CLYPEOSPHAERIACEÆ

ANTHOSTOMELLA ARECAE Rehm.

On *Areca catechu.* REHM, Leafl. Philip. Bot. 8 (1916) 2938—Los Baños (*Baker 3068*); BAKER, Philip. Agr. & For. 5 (1916) 74; Philip. Journ. Sci. 13 (1918) 165.

ANTHOSTOMELLA ARENGAE (Rac.) Rehm.

RACIBORSKI, Alg. und Pilze Javas 3 (1900) 27 (*Auerswaldia*); REHM, Philip. Journ. Sci. 8 (1900) 395 (*Auerswaldia decipiens*); 399 (*Anthostomella mindorensis*); SYDOW and THEISSEN, Ann. Myc. 13 (1900) 390; REHM, Leafl. Philip. Bot. 8 (1916) 2940; Ann. Myc. 16 (1918) 223, 224.

ANTHOSTOMELLA ATRONITENS Rehm.

On *Donax cannaeformis.* Ann. Myc. 15 (1917) 209.

ANTHOSTOMELLA CALAMI Rehm.

On *Calamus.* REHM, Leafl. Philip. Bot. 8 (1916) 2939—Mount Maquiling (*Baker 3186, 3345; Reyes,* comm. *Baker 3345*).

ANTHOSTOMELLA CALOCARPA Syd.

On *Pandanus sabutan.* Ann. Myc. 15 (1917) 209.

ANTHOSTOMELLA COCOINA Syd.

On *Cocos nucifera.* Philip. Agr. & For. 4 (1914) 160; Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 122.

ANTHOSTOMELLA CORYPHAE Rehm.

On *Corypha elata.* REHM, Leafl. Philip. Bot. 8 (1916) 2940—Los Baños (*Baker 2674*); Ann. Myc. 15 (1917) 209.

ANTHOSTOMELLA CORYPHAE Rehm f. MINUTISSIMA Rehm.

On *Corypha elata.* REHM, Leafl. Philip. Bot. 8 (1916) 2940—Los Baños (*Evaristo,* comm. *Baker 2572*).

ANTHOSTOMELLA DONACINA Rehm. f. ARENGAE Rehm.

On *Arenga.* REHM, Leafl. Philip. Bot. 8 (1916) 2940—Los Baños (*Baker 1797, 3064*).

ANTHOSTOMELLA EUMORPHA (Sacc. and Paoli) Rehm.

SACCARDO and PAOLI, Myc. Malacc. No. 89 (*Anthostoma eumorphum*).
On *Schizostachyum.* REHM, Leafl. Philip. Bot. 8 (1916) 2940—Los Baños (*Baker 2021b*).

ANTHOSTOMELLA GRANDISPORA Penz. and Sacc.

On *Bambusa* and *Schizostachyum.* PENZIG and SACCARDO, Malpighia 11 (1897) 392; REHM, Leafl. Philip. Bot. 8 (1916) 2939—Los Baños (*Reyes,* comm. *Baker 1425*); (*Baker 1954a*).

ANTHOSTOMELLA LUCENS Sacc.

On *Pandanus.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 19—Mount Banahao (*Baker 3860*).

On *Pandanus radicans.* Leafl. Philip. Bot. 9 (1925) 3135.

ANTHOSTOMELLA MICRASPIS (Berk.) Sacc. and Trav.

BERKELEY, Journ. Bot. (1842) 156 (*Sphaeria*); CURREY, Trans. Linn. Soc. Lond. Bot. 20 (1859) 321 (*Sphaeria*); SACCARDO and TRAVERSO, Syll. Fung. 19 (1910) 77; 22 (1913) 101.

On fallen limbs. REHM, Leafl. Philip. Bot. 8 (1916) 2938—Mount Maquiling (*Baker 2908; Reyes,* comm. *Baker 4025*).

ANTHOSTOMELLA MIRABILIS (B. and Br.) v. Hoehn. (Astrocystis mirabilis B. and Br.)

On *Bambusa.* SYDOW, Philip. Journ. Sci. § C 8 (1913) 485 (*A. discophora*); REHM, Leafl. Philip. Bot. 8 (1916) 2939—Los Baños (*Reyes,* comm. *Baker 3055, 3433, 3404, 3652*); Ann. Myc. 15 (1917) 209.

ANTHOSTOMELLA PANDANI (Rehm) Sydow.

On *Pandanus.* BAKER, Leafl. Philip. Bot. 7 (1914) 2453 (*Auerswaldia*); THEISSEN and SYDOW, Ann. Myc. 13 (1915) 300; REHM, Leafl. Philip. Bot. 8 (1916) 2939—Mount Banahao (*Baker 2236*).

ANTHOSTOMELLA UBERIFORMIS Rehm.

On dead trunk. REHM, Leafl. Philip. Bot. 8 (1916) 2937—Mount Maquiling (*Baker 3411*).

ASTROSPHARIELLA FUSISPORA Syd.

On *Bambusa blumeana.* Ann. Myc. 15 (1917) 209.

CEUTHOCARPON DEPOKENSE Penz. and Sacc.

On *Dracontomelum cumingianum.* PENZIG and SACCARDO, Malpighia 9 (1897) 405; REHM, Leafl. Philip. Bot. 8 (1916) 2953—Los Baños (*Raimundo,* comm. *Baker 2191a*).

CEUTHOCARPON PUNCTIFORME Sacc.

On *Sterculia.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 21—Los Baños (*Baker 3893*).

CEUTHOCARPON TALAUMAE Rehm.

On *Talauma villariana.* REHM, Leafl. Philip. Bot. 8 (1916) 2953—Los Baños (*Raimundo,* comm. *Baker 2843*).

CLYPEOSPHAERIA BAKERIANA Rehm.

On *Eugenia bataanensis* and *Grewia stylocarpa.* REHM, Leafl. Philip. Bot. 8 (1916) 2948—Mount Maquiling (*Baker 3481a*); (*Baker 3465*); Ann. Myc. 15 (1917) 209.

DIDYMOSPHAERIA ANISOMERA Sacc.

On *Andropogon sorghum* (*Sorghum vulgare, Holcus sorghum*). SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 20—Los Baños (*Baker 3800*); Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 138.

DIDYMOSPHAERIA CAESPITULOSA Sacc.

On *Premna cumingiana*. Ann. Myc. 13 (1915) 127.

DIDYMOSPHAERIA INCONSPICUA Rehm.

On *Premna odorata*. REHM, Leafl. Philip. Bot. 8 (1916) 2948—Los Baños (*Baker 2110b*).

DIDYMOSPHAERIA STRITULA Penz. and Sacc.

On *Bambusa vulgaris, Calamus*, and *Schizostachyum* sp. REHM, Leafl. Philip. Bot. 8 (1916) 2948—Los Baños (*Reyes*, comm. *Baker 1903*); Mount Maquiling (*Reyes*, comm. *Baker 3344, 3345*); Ann. Myc. 15 (1917) 208.

LINOSPORA ELASTICAE Koord.

KOORDERS, Bot. Untersuch (1917) 193.

On *Ficus*. REHM, Leafl. Philip. Bot. 8 (1916) 2954—Mount Maquiling (*Copeland*, comm. *Baker 3179a*).

LINOSPORA PANDANI Rehm.

On *Pandanus sabotan* and *P. utilissima*. REHM, Leafl. Philip. Bot. 8 (1916) 2954—Los Baños (*Reyes*, comm. *Baker 3045*); Mount Banahao (*Baker 2248*).

LINOSPORA SERIATA (Syd.) Rehm.

On *Bambusa blumeana*. SYDOW, Philip. Journ. Sci. 8 (1916) 272 (*Ophiobolus*); REHM, Leafl. Philip. Bot. 8 (1916) 2954—Mount Maquiling (*Baker 3417*).

PLEOSPORACEÆ

DIDYMELLA CARICAE Tassi.

On *Carica papaya*. Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 118.

DIDYMELLA EUTYPOIDES Rehm.

On *Bambusa*. REHM, Leafl. Philip. Bot. 8 (1916) 2943—Los Baños (*Reyes*, comm. *Baker 1915c*).

DIDYMELLA LUSSONIENSIS Sacc.

On *Dolichos uniflorus*. BAKER, Philip. Agr. & For. 3 (1914) 161; Phytopath. 9 (1919) 132.

On *Dolichos lablab*. Philip. Journ. Sci. 13 (1918) 167.

DIDYMELLA ORCHNODES Rehm.

On *Goniothalamus*. REHM, Leafl. Philip. Bot. 8 (1916) 2943—Mount Maquiling (*Baker 3085a*).

DIDYMELLA SERIATA Rehm.

On *Schizostachyum*. REHM, Leafl. Philip. Bot. 8 (1916) 2943—Los Baños (*Baker 1954b*).

DIDYMOSPHAERIA CAESPITULOSA Sacc.

On *Premna cumingiana*. SACCARDO, Ann. Myc. 13 (1915) 127—Los Baños (*Baker 2746*).

DIDYMOSPHAERIA STRIATULA Penz. and Sacc.

REHM, Leafl. Philip. Bot. 6 (1914) 2223—(*Phaodothis gigantochloae*); BAKER, Leafl. Philip. Bot. 8 (1914) 2455; THEISSEN and SYDOW, Ann. Myc. 13 (1915) 185.

LEPTOSPHAERIA ORTHOGRAMMA (B. and C.) Sacc.

BERKELEY and CURTIS, Cent. N. Am. Fung. (1853) No. 922 (*Sphaeria*); SACCARDO, Syll. Fung. 2 (1883) 60.

On *Zea mays*. REHM, Leafl. Philip. Bot. 8 (1916) 2951—Los Baños (*Raimundo*, comm. *Baker 1996*); BAKER, Philip. Agr. & For. 5 (1916) 78; Philip. Journ. Sci. 13 (1918) 170.

METASPHAERIA CORRUSCANS Rehm.

On *Capparis horrida*. REHM, Leafl. Philip. Bot. 8 (1916) 2950—Los Baños (*Baker 1429b*).

METASPHAERIA INCOMPLETA Rehm.

On *Eugenia*. REHM, Leafl. Philip. Bot. 8 (1916) 2949—Mount Maquiling (*Baker 2936b*).

OPHIOCHAETE BAKERIANA Sacc.

On *Calamus*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 21—Mount Maquiling (*Baker 3775*).

PHYSALOSPORA AFFINIS Sacc.

On *Theobroma cacao*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 18—Los Baños (*Baker 3779*); BAKER, Philip. Agr. & For. 5 (1916) 77; Philip. Journ. Sci. 13 (1918) 169; Phytopath. 9 (1919) 138.

PHYSALOSPORA BAMBUSAE (Rabh.) Sacc.

On *Bambusa*. BAKER, Philip. Agr. & For. 3 (1914) 159.

PHYSALOSPORA BAMBUSICOLA Rehm.

On *Bambusa*. BAKER, Philip. Agr. & For. 3 (1914) 159.

PHYSALOSPORA DINOCHLOAE Rehm.

On *Dinochloa*. REHM, Leafl. Philip. Bot. 8 (1916) 2937—Mount Maquiling (*Baker 2189a*).

PHYSALOSPORA GUIGNARDIOIDES Sacc.

On *Canavalia gladiata*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 19—Los Baños (*Baker 3809*); BAKER Philip. Agr. & For. 5 (1916) 74; Philip. Journ. Sci. 13 (1918) 166.

On *Phaseolus* spp. Phytopath. 9 (1919) 132.

PHYSALOSPORA HOYAE v. Hoehn.

V. HOEHNEL, Kais. Ak. Wiess. Wien 114 (1907) 122.

On *Hoya luzonica*. SYDOW, Leafl. Philip. Bot. 6 (1914) 2122 (*P. hoyae*); REHM, Leafl. Philip. Bot. 8 (1916) 2937—Los Baños (*Baker 3093*); Ann. Myc. 15 (1917) 207.

PHYSALOSPORA PERIBAMBUSINA Rehm.

On *Bambusa vulgaris.* REHM, Leafl. Philip. Bot. 8 (1916) 2937—Los Baños (BAKER *6; Reyes,* comm. *Baker 1896, 1901*).

TEPHROSTICTA FICINA Syd.

On *Payena leeri.* Ann. Myc. 15 (1917) 179.

On *Coix lacryma-jobi.* Ann. Myc. 15 (1917) 208.

OPHIOBOLUS HETEROSTROPHUS Drechsler.

Journ. Agr. Res. 31 (1925) 701–726; Philip. Agr. 19 (1931) 581–589.

OPHIOBOLUS NIPAE Henn.

On *Nipa fructicans.* BAKER, Philip. Agr. & For. 3 (1914) 163.

OPHIOBOLUS ORYZAE I. Miyake.

Journ. Coll. Agr., Imp. Univ. Tokyo 2 (1910) 237–276.

OPHIOBOLUS ORYZINUS Sacc.

On *Oryza sativa.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 21—Los Baños (*Baker 3774, 3803* err. *3305*); BAKER, Philip. Agr. & For. 5 (1916) 76; REINKING, Philip. Journ. Sci. 13 (1918) 168; REINKING, Phytopath. 9 (1919) 131.

MASSARIACEÆ

MASSARIA BATAANENSIS Rehm.

On *Eugenia bataanensis.* REHM, Leafl. Philip. Bot. 8 (1916) 2951—Mount Maquiling (*Baker 3481b*).

MASSARINA RAIMUNDOI Rehm.

On *Citrus nobilis.* BAKER, Philip. Agr. & For. 3 (1914) 160; REINKING, Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 119.

MASSARINULA BAMBUSICOLA Rehm.

On *Bambusa vulgaris.* REHM, Leafl. Philip. Bot. 8 (1916) 2944—Los Baños (*Reyes,* comm. *Baker 1915b*).

MASSARINULA DONACINA Rehm.

On *Donax cannaeformis.* REHM, Leafl. Philip. Bot. 8 (1916) 2944—Los Baños (*Raimundo,* comm. *Baker 2013*).

MASSARINULA OBLIQUA Sacc.

On *Mischocarpus fuscescens.* SACCARDO, Ann. Myc. 13 (1915) 127—Los Baños (*Baker 2253*).

MASSARINA RAIMUNDOI Rehm.

On *Citrus nobilis.* REINKING, Philip. Agr. 9 (1920–21) 133.

GNOMONIACEÆ

GLOMERELLA CINGULATA (Stonem.) S. and v. S.

On *Persea americana* and *Mangifera indica.* Philip. Agr. 15 (1926) 128; Philip. Agr. Rev. 20 (1926) 271; 21 (1926) 81.

On *Lagenaria leucantha.* Philip. Agr. 14 (1926) 213.

PHOMATOSPORA MIGRANS Rehm.

On *Arenga saccharifera.* REHM, Leafl. Philip. Bot. 8 (1916) 2936 Los Baños (*Reyes*, comm. *Baker 1455*); BAKER, Philip. Agr. & For. 5 (1916) 74; Ann. Myc. 16 (1918) 216.

VALSACEÆ

DIAPORTHE CITRINCOLA Rehm.

On *Citrus nobilis.* BAKER, Philip. Agr. & For. 3 (1914) 160; Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 119; REINKING, Philip. Agr. 9 (1920–21) 133.

DIAPORTHE RECONDITA Sacc.

On *Gliricidia maculata.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 22—Los Baños (*Baker 3793*).

ENDOXYLA MANGIFERAE Henn.

On *Mangifera indica.* BAKER, Philip. Agr. & For. 3 (1914) 162; Philip. Journ. Sci. 13 (1918) 167; Phytopath. 9 (1919) 127.

EUTYPA BAMBUSINA Penz. and Sacc.

On *Bambusa blumeana.* BAKER, Philip. Agr. & For. 3 (1914) 159.
On dead culms of bamboo. Philip. Journ. Sci. 12 (1917) 377.
On *Bambusa* and *Schizostachyum.* Ann. Myc. 15 (1917) 213.
On *Schizostachyum lumampao.* Ann. Myc. 21 (1923) 101.
On *Bambusa* sp. Ann. Myc. 26 (1928) 431.

EUTYPA HETERACANTHA Sacc.

Syll. Fung. 1: 177; 9: 466.
On *Citrus decumana.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 22—Los Baños (*Baker 3897*); Phytopath. 9 (1919) 119.
On *Citrus maxima.* REINKING, Philip. Agr. 9 (1920–21) 134.

EUTYPA LUDIBUNDA Sacc.

On branches. Ann. Myc. 15 (1917) 213.

PERONEUTYPELLA ARECAE Sydow.

On *Areca catechu.* Philip. Agr. & For. 4 (1914) 158; REINKING, Philip. Journ. Sci. 13 (1918) 165.
On *Cocos nucifera.* Ann. Myc. 15 (1917) 213; Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 122.

PERONEUTYPELLA GRAPHIDIOIDES Syd.

On *Terminalia catappa.* Phytopath. 9 (1919) 138.

EUTYPELLA CITRICOLA Speg.

On *Citrus nobilis.* BAKER, Philip. Agr. & For. 3 (1914) 160; SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 22—Los Baños (*Baker 3898*).
On *Citrus maxima.* Philip. Journ. Sci. 13 (1918) 165; 166; Phytopath. 9 (1919) 119; REINKING, Philip. Agr. 9 (1920–21) 133, 134.
On *Citrus aurantifolia.* Ann. Myc. 21 (1923) 101.

EUTYPELLA COCOS Ferd. and Winge.

On *Cocos nucifera.* Philip. Agr. & For. 4 (1914) 160; Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 122.

EUTYPELLA LEUCAENAE Rehm.

On *Leucaena glauca.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 22—Los Baños (*Baker 3741*).

EUTYPELLA LINEOLATA Rehm.

On *Mallotus philippinensis.* REHM, Leafl. Philip. Bot. 8 (1916) 2955—Los Baños (*Baker 3060b*).

EUTYPELLA MALLOTI Rehm.

On *Mallotus philippinensis.* REHM, Leafl. Philip. Bot. 8 (1916) 2955—Los Baños (*Baker 3060a*).

EUTYPELLA REHMIANA (Henn. and Nym.) v. Höhnel.

On *Areca catechu.* Philip. Journ. Sci. 13 (1918) 165.

THYRIDARIA CALAMINCOLA Rehm.

On *Calamus.* REHM, Leafl. Philip. Bot. 8 (1916) 2957—Mount Maquiling (*Baker 3230b*).

THYRIDARIA EMINENS Rehm.

On *Streblus asper.* REHM, Leafl. Philip. Bot. 8 (1916) 2957—Los Baños (*Raimundo,* comm. *Baker 2977*).

THYRIDARIA TARDA Bancroft.

On *Theobroma cacao.* Philip. Agr. & For. 4 (1915) 164; Phytopath. 9 (1919) 138.

MELANCONIDACEÆ

VALSARIA CITRI Rehm.

On *Citrus nobilis.* BAKER, Philip. Agr. & For. 3 (1914) 160; REINKING, Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 119; Philip. Agr. 9 (1920–21) 133.

VALSARIA INSITIVA (de Not) Ces. and de Not.

On *Morus alba.* BAKER, Philip. Agr. & For. 3 (1914) 162; REINKING, Philip. Journ. Sci. 13 (1918) 168; Phytopath. 9 (1919) 128.

DIATRYPACEÆ

DIATRYPELLA BARLERIAE Syd.

On *Barleria cristata.* BAKER, Philip. Agr. & For. 5 (1916) 74—Los Baños.

DIATRYPELLA PSIDII Syd.

On *Psidium guajava.* REINKING, Phytopath. 9 (1919) 133.

MELOGRAMMATACEÆ

BOTRYOSPHAERIA MINUSCULA Sacc.

On *Theobroma cacao.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 18—Los Baños (*Baker 3777, 3780*); BAKER, Philip. Agr. & For. 5 (1916) 77; REINKING, Philip. Journ. Sci. 13 (1918) 169; Phytopath. 9 (1919) 139.

XYLARIACEÆ

HYPOXYLON ANNULATUM (Schw.) Mont.

On dead bark. REHM, Leafl. Philip. Bot. 8 (1916) 2957—Los Baños (*Baker 2906*); Ann. Myc. 15 (1917) 211.

HYPOXYLON ATROPURPUREUM Fr.

On *Citrus nobilis*. Philip. Journ. Sci. 13 (1918) 166.

On coccids. REINKING, Phytopath. 9 (1919) 119; Philip. Agr. 9 (1920–21) 133.

HYPOXYLON CULMORUM Cke.

On *Schizostachyum* sp. Ann. Myc. 15 (1917) 212.

HYPOXYLON EFFUSUM Nitsch.

On bark of dead trees in the forest. Philip. Journ. Sci. 12 (1917) 378.

HYPOXYLON FREYCINETIAE Rehm.

On *Freycinetia*. REHM, Leafl. Philip. Bot. 8 (1916) 2959—Mount Maquiling (*Baker 3416*); Ann. Myc. 15 (1917) 211; 21 (1923) 101.

HYPOXYLON GRANULOSUM Bull.

BULLIARD, Champ. (1791) 176.

On dead branches. REHM, Leafl. Philip. Bot. 8 (1916) 2958—Los Baños (*Reyes*, comm. *Baker 2838*).

HYPOXYLON HAEMATOSTROMA Mont.

On *Schizostachyum* and *Bambusa*. REHM, Leafl. Philip. Bot. 8 (1916) 2958—Mount Maquiling (*Baker 3904*); (*Reyes*, comm. *Baker 1894a*).

HYPOXYLON MARGINATUM (Schw.) Berk.

On dead limbs. REHM, Leafl. Philip. Bot. 8 (1916) 2958—Mount Maquiling (*Baker 3483*).

On wood. Ann. Myc. 15 (1917) 211.

On bark of dead trees in the forest. Philip. Journ. Sci. 12 (1917) 378.

HYPOXYLON MARGINATUM (Schw.) Berk. var. MAMMIFORME Rehm.

On fallen limbs. REHM, Leafl. Philip. Bot. 8 (1916) 2958—Mount Maquiling (*Baker 3038*).

HYPOXYLON RUBIGINEO-AREOLATUM Rehm var. MICROSPORUM Theiss.

THEISSEN, Ann. Myc. 6: 345.

On *Polyscias nodosa*. REHM, Leafl. Philip. Bot. 8 (1916) 2958—Mount Maquiling (*Baker 2894*).

On dead stems. Ann. Myc. 15 (1917) 212.

HYPOXYLON SUBEFFUSUM Speg.

SPEGAZZINI, Fung. Gnar. Pug. 1: No. 204; SACCARDO, Syll. Fung. 9 (1891) 556.

On rotten limbs. REHM, Leafl. Philip. Bot. 8 (1916) 2958—Los Baños (*Reyes*, comm. *Baker 2837*); Ann. Myc. 15 (1917) 217.

KRETZMARIA GHOMPHOIDEA Penz. and Sacc.

On rotten wood in forests. Philip. Journ. Sci. 12 (1917) 379.

NUMMULARIA CITRINCOLA Rehm.

On *Citrus*. REHM, Leafl. Philip. Bot. 8 (1916) 2961—Los Baños (*Baker 3062*); REINKING, Philip. Agr. 9 (1920–21) 134.

NUMMULARIA FRAGILLIMA Rehm.

On *Calamus*. REHM, Leafl. Philip. Bot. 8 (1916) 2959—Mount Maquiling (*Baker 3187*).

NUMMULARIA GLYCYRRHIZA (B. and C.) Sacc.

On dead trunk. Ann. Myc. 15 (1917) 212.

NUMMULARIA LIANAE Rehm.

On a liana, perhaps *Bauhinia*. REHM, Leafl. Philip. Bot. 8 (1916) 2959—Mount Maquiling (*Baker 2881*).

NUMMULARIA MEMORABILIS Rehm.

On dead wood. REHM, Leafl. Philip. Bot. 8 (1916) 2960—Mount Maquiling (*Baker 3432*).

NUMMULARIA PAPYRACEA Rehm.

On dead trunk. Ann. Myc. 15 (1917) 212.

NUMMULARIA REYESIANA Rehm.

On *Bambusa* sp. and *B. blumeana*. REHM, Leafl. Philip. Bot. 8 (1916) 2960—Los Baños (*Reyes*, comm. *Baker 1906*); (*Baker 1114, 1624, 2574*); REHM, Leafl. Philip. Bot. 6: 2203—*Hypoxylon culmorum*, non Cke.).

On dead stems of bamboo. Philip. Journ Sci. 12 (1917) 378.

NUMMULARIA SCUTATA B. and C.

On fallen limbs and on *Cyrilla*. REHM, Leafl. Philip. Bot. 8 (1916) 2961—Mount Maquiling (*Baker 3419, 3431*); (*Baker 3414*).

NUMMULARIA URCEOLATA Rehm.

On bark. Ann. Myc. 15 (1917) 212.

XYLARIACEÆ

DALDINIA CONCENTRICA (Bolt.) Ces. and de Not.

On dead logs. Philip. Journ. Sci. 13 (1918) 378.

On *Citrus maxima*. REINKING, Philip. Agr. 9 (1920–21) 134.

On trunks of trees. Ann. Myc. 15 (1917) 212.

DALDINIA CONCENTRICA var. MICROSPORA (Starb.) Theiss.

On trunks of trees. Ann. Myc. 15 (1917) 212.

DALDINIA ESCHOLZII Ehr.

On trunks of trees. Ann. Myc. 15 (1917) 212.

XYLARIA ALLANTOIDEA Berk.

Ann. Myc. 15 (1917) 213.

XYLARIA CASTOREA Berk.

REINKING, Philip. Agr. 9 (1920–21) 133.

XYLARIA CORNIFORMIS Fr.

On rotten logs. Philip. Journ. Sci. 12 (1917) 379.

XYLARIA EUGLOSSIA Fr.

On rotten logs. Ann. Myc. 15 (1917) 213.

XYLARIA GRAMMICA Mont.

On logs. Ann. Myc. 15 (1917) 213.

XYLARIA HYPOXYLON (L.) Grev. f. TROPICA Syd.

On rotting logs. Ann. Myc. 15 (1917) 212.

XYLARIA LUZONENSIS Henn.

On dead pods of *Bauhinia* lying on the ground in dense forests. Philip. Journ. Sci. 12 (1917) 379.

XYLARIA NIGRIPES (Klot.) Sacc.

On deserted termite nests. Philip. Journ. Sci. 13 (1918) 227.

XYLARIA OBVATA Berk.

On logs. Ann. Myc. 15 (1917) 213.

XYLARIA PLEBEJA Ces.

On bark. Ann. Myc. 15 (1917) 213.

XYLARIA TABACINA (Kickx.) Berk.

On dead limbs. REHM, Leafl. Philip. Bot. 8 (1916) 2961—Mount Maquiling (*Baker 3395*).

XYLARIA TUBEROSA (Pers.) Cke.

On rotting wood and logs. Ann. Myc. 15 (1917) 213.

HYSTERIALES

HYPODERMATACEÆ

LOPHODERMIUM ALEURITIS Rehm.

On dead leaves. REHM, Leafl. Philip. Bot. 8 (1915) 2925—Los Baños (*Baker 3444*).

LOPHODERMIUM ARUNDINACEUM (Schrad.) Chev.

SCHRADER, Journ. f. d. Bot. 2 (1799) 62 (*Hysterium*); FRIES, Syst. Myc. 2 (1821) 590 (*Hysterium*); CHEVALIER, Flor. par. 1 (1826) 435; SACCARDO, Syll. Fung. 2 (1883) 795.

On dead leaves of *Livistona*. REHM, Leafl. Philip. Bot. 8 (1915) 2925—Mount Maquiling (*Baker 3422*).

LOPHODERMIUM ARUNDINACEUM (Schrad.) Chev. f. VULGARE Fckl.

On dead *Miscanthus japonicus*. REHM, Leafl. Philip. Bot. 8 (1915) 2926—Mount Maquiling (*Baker 3527, 3540*).

LOPHODERMIUM PASSIFLORAE Rehm.

BAKER, Philip. Agr. & For. 3 (1914) 163.

LOPHODERMIUM PLANCHONIAE Rehm.

On dead leaves of *Planchonia spectabilis.* REHM, Leafl. Philip. Bot. 8 (1915) 2925—Los Baños (*Baker 3080*).

LOPHODERMIUM ROTUNDATUM Syd.

On *Canarium* sp. Ann. Myc. 15 (1917) 251.

HYSTERIACEÆ

ALDONA STELLA NIGRA Rac.

On *Pterocarpus* sp. Leafl. Philip. Bot. 9 (1925) 3137.

HYSTERIUM ANCEPS Sacc.

On *Streblus asper.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 24—Los Baños (*Baker 3831*).

SCHIZOTHYRIUM ACERIS (P. Henn. and Lind.) Pat.

On *Acer* sp. Ann. Myc. 15 (1917) 251.
On *Acer niveum.* Ann. Myc. 21 (1923) 104.

PEZIZALES

CENANGIACEÆ

CENANGIUM BLUMEANUM Rehm.

On dead *Bambusa blumeana.* REHM, Leafl. Philip. Bot. 8 (1915) 2927—Los Baños (*Raimundo*, comm. *Baker 2927b*).

PATELLARIACEÆ

LAGERHEIMA DERMATOIDEA Rehm.

On dead *Derris philippinensis.* REHM, Leafl. Philip. Bot. 8 (1915) 2928—Los Baños (*Baker 2006a*).

PACHYPATELLA ALSOPHILAE (Rac.) Theiss. and Syd.

On *Alsophila.* RACIBORSKI, Paras. Alg. und Pilze Javas 2 (1900) 22 (*Hysterostomella*)—Java; SYDOW, Philip. Journ. Sci. § C 8 (1913) 495 (*Discodothis lobata* Syd.); BAKER, Leafl. Philip. Bot. 6 (1914) 2102 (*Discodothis lobata*).
On *Cyathea caudata.* THEISSEN and SYDOW, Ann. Myc. 13 (1915) 228; 15 (1917) 252.

BULGARIACEÆ

BULGARIASTRUM CAESPITOSUM Syd.

On *Capparis sepiaria.* Philip. Journ. Sci. 13 (1918) 361.

MOLLISIACEÆ

CALOPEZIZA MIRABILIS Syd.

On *Premna odorata.* Ann. Myc. 15 (1917) 218.

MOLLISIA RAVIDA Sydow.

On *Lagerstroemia indica* and *L. speciosa.* Philip. Agr. & For. 4 (1914) 161.

NIPTERA GREWIAE Rehm.

On leaves of *Grewia.* REHM, Leafl. Philip. Bot. 8 (1915) 2928—Los Baños (*Baker 2885*).

TRICHOBELONIUM MELIOLOIDES Rehm.

On leaves of *Gigantochloa scribneriana.* REHM, Leafl. Philip. Bot. 8 (1915) 2929—Hills back of Paete, Luzon (*Baker 3115*).

HELOTIACEÆ

SCLEROTINIA NERVISEQUIA Schroet. v. BAMBUSACEA Rehm.

On dead *Bambusa vulgaris* and on dead leaves of *Dimerocalyx longipes.* REHM, Leafl. Philip. Bot. 8 (1915) 2930—Los Baños (*Reyes,* comm. *Baker 1911*); Mount Maquiling (*Reyes,* comm. *Baker 4119,* err. *3221*).

PEZIZACEÆ

HUMARIA CABALLINA Rehm.

On horse dung. REHM, Leafl. Philip. Bot. 8 (1915) 2930—Mount Maquiling (*Copeland,* comm. *Baker 3637*).

LACHNEA LIVIDA (Schum.) Gill.

SACCARDO, Syll. Fung. 8: 187.

On decaying plant remains on ground. SACCARDO, Nuovo Giorn. Bot. 23 (1916) 24—Los Baños (*Baker 2896,* err. *3897*).

LACHNEA LURIDA P. Henn. and E. Nym.

On *Polyporus.* Ann. Myc. 15 (1917) 252.

PEZIZELLA OMBROPHILACEA Rehm.

On leaves of *Psidium guajava.* REHM, Leafl. Philip. Bot. 8 (1915) 2929—Los Baños (*Raimundo,* comm. *Baker 1984*); BAKER, Philip. Agr. & For. 5 (1916) 76; Phytopath. 9 (1919) 133.

PILOCRATERA TRICHOLOMA (Mont.) P. Henn.

On logs. Ann. Myc. 15 (1917) 252.

PLICARIA BANANINCOLA Rehm.

On *Musa sapientum.* Philip. Journ. Sci. 13 (1918) 168.

On *Musa paradisiaca sapientum.* Phytopath. 9 (1919) 129.

PLICARIA TROPICA Rehm.

On burnt *Bambusa.* REHM, Leafl. Philip. Bot. 8 (1915) 2931—Los Baños (*Raimundo,* comm. *Baker 1445*).

TRIBLIDIACEÆ

TRYBLIDIELLA MINDANAENSIS P. Henn.

On branches. Ann. Myc. 15 (1917) 251.

On *Premna.* Philip. Journ. Sci. 12 (1917) 362.

On *Hevea brasiliensis.* Philip. Journ. Sci. 13 (1918) 167, 362.

On *Citrus nobilis.* Philip. Journ. Sci. 13 (1918) 166; REINKING, Philip. Agr. 9 (1920–21) 133.

On *Aberia gardneri.* Ann. Myc. 21 (1923) 104.

TRYBLIDIELLA RUFULA (Spreng.) Sacc.

On *Citrus nobilis.* Philip. Journ. Sci. 13 (1918) 166; REINKING, Philip. Agr. 9 (1920–21) 133.

PHACIDIALES

STICTIDACEÆ

BRIARDIA MAQUILINGIANA Rehm.

On *Tetrastigma.* REHM, Leafl. Philip. Bot. 8 (1915) 2927—Mount Maquiling (*Reyes,* comm. *Baker 3320*).

PROPOLIDIOPSIS ARENGA Rehm.

On *Arenga.* REHM, Leafl. Philip. Bot. 8 (1915) 2927—Los Baños (*Baker 2899*).

PHACIDIACEÆ

COCCOMYCES DUBIUS Rehm.

On *Ficus minahassae.* REHM, Leafl. Philip. Bot. 8 (1915) 2926—Los Baños (*Reyes,* comm. *Baker 3480*).

COCCOMYCES QUADRATUS (Schw. and Kze.) Karst. var. PHILIPPINUS Rehm.

On dead leaves of *Neolitsea.* REHM, Leafl. Philip. Bot. 8 (1915) 2926—Mount Maquiling (*Baker 3446*).

RHAGADOLOBIUM BAKERIANUM Sacc.

On *Cyathus.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 24—Mount Maquiling (*Baker 3841*); Ann. Myc. 20 (1922) 73.

RHYTISMA LAGERSTROEMIA Rabh.

RABENHORST, Hedw. 31 (1878); BERKELEY and BROOME, Grev. 6 (1878) 110 (*R. pongamiae*).

On *Lagerstroemia indica* and *L. speciosa.* Philip. Agr. & For. 4 (1914) 161; REHM, Leafl. Philip. Bot. 8 (1915) 2926—Morong Valley, Rizal Province (*Raimundo,* comm. *Baker 2580*); Philip. Journ. Sci. 12 (1917) 362; Ann. Myc. 15 (1917) 251.

MYRIANGIALES

ELSINOEÆ

ELSINOE CANAVALIAE Rac.

On *Canavalia ensiformis.* BAKER, Philip. Agr. & For. 3 (1914) 159; Ann. Myc. 15 (1917) 255.

On *Canavalia gladiata.* Philip. Journ. Sci. 13 (1918) 165.

On *Phaseolus* spp. Phytopath. 9 (1919) 132.

MYRIANGIUM DURIAEI Mont.

On coccids. REINKING, Philip. Agr. 9 (1920–21) 133, 146.

PHYCOMYCETES

OOMYCETES

CHYTRIDIALES

SYNCHYTRIACEÆ

WORONINELLA AECIDIOIDES (Peck.) Syd.

PECK, 24th Rep. N. Y. State Mus. 88 (1872) (*Uredo*); THUEMEN, Myc. Univ. No. 538 (1876) (*Uredo peckii*); FARLOW, Bull. Bussey Inst. 2

(1878) 229 (*Synchytrium fulgens* v. *decipiens*); FARLOW, Bot. Gaz. 10 (1885) 240 (*Synchytrium decipiens*); PECK, in C. L. Shear, N. Y. Fungi. Exsicc. No. 126 (1895) (*Synchytrium aecidioides*); WILSON and SEAVER, Ascom. & Lower Fungi. Exsicc. No. 72 (*Synchytrium aecidioides*) (1909); WILSON and SEAVER, Mycologia 1 (1909) 272 (*Synchytrium aecidioides*); BAKER, Leafl. Philip. Bot. 6 (1914) 2149 (*Synchytrium aecidioides*); SYDOW, Ann. Myc. 12 (1914) 485.

WORONINELLA DOLICHI (Cke.) Syd.

COOKE, Grevilea 10 (1882) 127 (*Aecidium*); HENNINGS, Engl. Bot. Jahrb. 38 (1905) 103 (*Uromyces vignicola*); SYDOW, Ann. Myc. 12 (1914) 486—On *Dolichos gibbosus, Glycine javanica, Dunbaria ferrignes,* and *Vigna sinensis* in Ant. Africa, South Africa, India, and Philippines.

On *Dolichos lablab.* Philip. Journ. Sci. 13 (1918) 167.

WORONINELLA PSOPHOCARPI Rac.

RACIBORSKI, Zeitschr. f. Pflanzenk 195 (1898); SYDOW, Ann. Myc. 1 (1903) 15 (*Uromyces*); 13 (1914) 486—On *Psophocarpus* in Java, Philippines, and West Africa.

On *Psophocarpus tetragonolobus.* BAKER, Philip. Agr. & For. 5 (1916) 76; Philip. Journ. Sci. 13 (1918) 169; Phytopath. 9 (1919) 133; Ann. Myc. 26 (1928) 414.

WORONINELLA PUERARIAE (Henn.) Syd.

HENNINGS, Engl. Bot. Jahrb. 15 (1892) 6 (*Aecidium*); DIETEL, Engl. Bot. Jahrb. 28 (1900) 282 (*Uromyces*); MIYABE, Bot. Mag. Tokyo 19 (1905) 199 (*Synchytrium*); SYDOW, Ann. Myc. 12 (1914) 486—On *Pueraria* in Java, New Guinea, Philippines, and Japan.

MYCOCHYTRIDIACEÆ

AMPHOROMORPHA ENTOMOPHILA Thaxter.

THAXTER, Bot. Gaz. 58 (1914) 251—Manila, on *Diochus conicicallis* Mots. and on *Labia* sp. (*Banks*).

PYTHIACEÆ

PYTHIUM DEBARYANUM Hesse.

HESSE, Phytium de Baryanum (1874) 34; SADEBECK, Stiz. Bot. ver. Brandeb. (1874) 116 (*P. esquiseti*); LOHDE, Uebe in paras Pilze (1874) 203 (*Lucidium pythiodes*); SMITH, Gard. Chron. 5 (1876) 656; SADEBECK, Tagebl. 49 Vers. deutsch. Naturf. u. Aerzte (1876) (*P. autumnale*); BERLESE and DE TONI, Syll. Fung. 7 (1888) 271 (excl. syn. *P. vexans*); ATKINSON, Bull. Cornell Exp. Sta. 94 (1895) (*Artotrogus*); BUTLER, Mem. Dept. Agr. India 1 (1907) No. 5, 86.

On *Camelia sativa, Lepidium sativum,* and *Ricinus communis.* Philip. Agr. & For. 5 (1916) 70.

On *Carica papaya, Lycopersicum esculentum,* and *Nicotiana tabacum.* Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 30.

On *Oryza sativa.* Philip. Agr. 15 (1926) 290, 362.

PERONOSPORALES

PERONOSPORACEÆ

PHYTOPHTHORA COLOCASIAE Rac.

On *Colocasia esculentum* (*Colocasia antiquorum*). RACIBORSKI, Paras Alg. Pilze Javas 1 (1900) 9—Java; SYDOW and BUTLER, Ann. Myc. 5 (1907) 512; BUTLER and KULKARNI, Mem. Dept. Agr. India 5 (1913) No. 5, 233–259; MENDIOLA and ESPINO, Philip. Agr. & For. 5 (1916) 68—Los Baños; BAKER, Philip. Agr. & For. 5 (1917) 74; REINKING, Philip. Journ. Sci. 13 (1918) 167; REINKING, Phytopath. 9 (1919) 123; Philip. Agr. Rev. 18 (1925) 560; Philip. Agr. 14 (1925–26) 439.

PHYTOPHTHORA FABERI Maubl.

MAUBLANC, L'Agr. Prat. Pays Chauds No. 79 (1909) 315; COLEMAN, Ann. Myc. 8 (1910) 621 (*P. theobromae*).

On *Theobroma, Hevea,* and *Artocarpus.* SACCARDO and TROTTER, Syll. Fung. 21 (1912) 86.

On *Theobroma cacao* and *Carica papaya.* MENDIOLA and ESPINO, Philip. Agr. & For. 5 (1916) 66—Los Baños; BAKER, Philip. Agr. & For. 5 (1916) 77; REINKING, Philip. Journ. Sci. 13 (1918) 166.

On *Cocos nucifera.* REINKING, Philip. Journ. Sci. 14 (1919) 131; Journ. Agr. Res. 25 (1923) 267.

On *Citrus* spp. OCFEMIA and ROLDAN, Am. Journ. Bot. 14 (1927) 1.

PHYTOPHTHORA INFESTANS (Mont.) de Bary.

On *Lycopersicum esculentum.* Phytopath. 9 (1919) 127.

On *Solanum tuberosum.* Philip. Agr. & For. 5 (1916) 65; Philip. Journ. Sci. 13 (1918) 169, 361; Philip. Agr. 10 (1922) 348.

PHYTOPHTHORA MELONGENAE K. Sawada.

On *Solanum melingena.* Noji Shikenjo Tokubetsu Hokoku 2 (1915) 77–79; Mycologia 9 (1917) 249-253; Philip. Agr. 14 (1925) 317-328.

PHYTOPHTHORA PHASEOLI Thaxter.

On *Sandoricum koetjape* (*S. indicum*). CLARA, Philip. Journ. Sci. 35 (1928) 423.

SCLEROSPORA PHILIPPINENSIS Weston and SCHLEROSPORA SPONTANEA Weston. (Sclerospora maydis (Rac.) Butler.)

On *Zea mays.* RACIBORSKI, Ber. de Deutsch. Bot. Gessellsch. 15 (1897) 475 (*Peronospora*); SACCARDO and SYDOW, Syll. Fung. 14 (1899) 460 (*Peronospora*); BERLESE, Riv. Pat. Veg. 10 (1904) 219 (*Peronospora*); BUTLER, Mem. Dept. Agr. Ind. Bot. 5 (1913) No. 5, 275; BAKER, Philip. Agr. & For. 5 (1916) 78—Los Baños; Philip. Journ. Sci. 13 (1918) 131; Phytopath. 9 (1919) 139; Journ. Agr. Res. 19 (1920) 97; Philip. Agr. 8 (1920) 333; Journ. Agr. Res. 20 (1921) 678; Phytopath. 11 (1921) 372; Journ. Agr. Res. 20 (1921) 559; 23: 276, 726; Philip. Agr. 15 (1926) 127.

SCLEROSPORA SACCHARI Miyake.

On *Saccharum officinarum.* Phytopath. 11 (1921) 371.

ZYGOMYCETES

MYCORALES

MUCORACEÆ

RHIZOPUS ARTOCARPI Rac.

On *Artocarpus integra* (*Artocarpus integrifolia*). BAKER, Philip. Agr. & For. 3 (1914) 158; Philip. Journ. Sci. 13 (1918) 361; REINKING, Philip. Journ. Sci. 13 (1918) 131; Philip. Agr. 12 (1923–24) 465.

On *Artocarpus communis*. REINKING, Philip. Journ. Sci. 13 (1918) 131; Phytopath. 9 (1919) 116.

On *Artocarpus incisa*. REINKING, Phytopath. 9 (1919) 116.

RHIZOPUS NIGRICANS Ehrenberg.

On fiber of *Musa textilis*. Philip. Journ. Sci. 32 (1927) 79.

PILOBOLACEÆ

PILOBOLUS LENTIGER Cda.

CORDA, Icon. Fung. 1 (1837) 22; SACCARDO, Syll. Fung. 7 (1837) 188, GROVE, Journ. Bot. (1884) 132 (*P. kleinii* var. *sphaerospora*).

On horse dung. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 25—Los Baños (*Baker 3892*).

FUNGI IMPERFECTI

SPHAERIOPSIDALES

SPHAERIOIDACEÆ

ASTEROMA PHASEOLI Brun.

SACCARDO, Syll. Fung. 10 (1916) 219.

On pods of *Phaseolus vulgaris*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 25—Los Baños (*Baker 3728*); BAKER, Philip. Agr. & For. 5 (1916) 76; REINKING, Philip. Journ. Sci. 13 (1916) 166; Phytopath. 9 (1919) 132.

BAKEROPHOMA SACCHARI Diedicke.

On *Saccharum officinarum*. BAKER, Philip. Agr. & For. 5 (1916) 76—Los Baños; DIEDICKE, Ann. Myc. 14 (1916) 62; REINKING, Philip. Journ. Sci. 13 (1918) 166; Philip. Agr. Rev. 11 (1918) 275; Phytopath. 9 (1919) 134; Philip. Agr. Rev. 14 (1921) 430.

BOTRYODIPLODIA ANCEPS Sacc. and Syd.

On *Morus alba*. BAKER, Philip. Agr. & For. 3 (1914) 162; Ann. Myc. 15 (1917) 28; REINKING, Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 128.

BOTRYODIPLODIA CURTA Sacc.

On *Ricinus communis*. Ann. Myc. 15 (1917) 258.

CONIOTHYRIUM COFFEAE Henn.

On *Coffea arabica*. BAKER, Philip. Agr. & For. 3 (1914) 160; REINKING, Phytopath. 9 (1919) 122.

On *Coffea* spp. REINKING, Philip. Journ. Sci. 13 (1918) 166.

CYTOSPORA ABERRANS Sacc.

On *Citrus nobilis.* BAKER, Philip. Agr. & For. 3 (1914) 160; REINKING, Philip. Journ. Sci. 13 (1918) 166.

On *Citrus* sp. Ann. Myc. 15 (1917) 256.

On coccids. REINKING, Phytopath. 9 (1919) 119.

CYTOSPORA PALMICOLA B. and Cke.

On *Cocos nucifera.* Ann. Myc. 15 (1917) 256; REINKING, Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 122.

DIPLODIA ARTOCARPI Sacc.

BAKER, Philip. Agr. & For. 3 (1914) 158.

On *Artocarpus communis.* REINKING, Philip. Journ. Sci. 13 (1918) 166.

On *Artocarpus incisa.* REINKING, Phytopath. 9 (1919) 116.

DIPLODIA ARTOCARPINA Sacc.

On *Artocarpus integra* (*A. integrifolia*). BAKER, Philip. Agr. & For. 3 (1914) 158; REINKING, Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 116.

DIPLODIA CARICAE Sacc.

On *Carica papaya.* BAKER, Philip. Agr. & For. 3 (1914) 159; Ann. Myc. 15 (1917) 257; REINKING, Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 118.

DIPLODIA CIRCINANS B. and Br.

On *Yucca aloifolia.* Ann. Myc. 15 (1917) 257.

DIPLODIA COCOCARPA Sacc.

On *Cocos nucifera.* BAKER, Philip. Agr. & For. 3 (1914) 160; REINKING, Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 122.

DIPLODIA COCOCARPA var. MALACCENSIS Tassi.

On *Cocos nucifera.* REINKING, Philip. Journ. Sci. 13 (1918) 166.

DIPLODIA CREBRA Sacc.

On fruits of *Musa sapientum.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 28—Los Baños (*Baker 3743*, err. *3745*); BAKER, Philip. Agr. & For. 5 (1916) 75; REINKING, Philip. Journ. Sci. 13 (1918) 168.

On *Musa* sp. REINKING, Phytopath. 9 (1919) 127.

DIPLODIA DATURAE Sacc.

On *Datura alba.* Ann. Myc. 15 (1917) 257.

DIPLODIA DURIONIS Sacc. and Syd.

On *Durio zibethinus.* BAKER, Philip. Agr. & For. 3 (1914) 161.

DIPLODIA MANIHOTI Sacc.

On *Manihot utilissima.* BAKER, Philip. Agr. & For. 3 (1914) 162; SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 28—Los Baños (*Baker 3888*); REINKING, Philip. Journ. Sci. 13 (1918) 168; Phytopath. 9 (1919) 128.

DIPLODIA MORI West.

SACCARDO, Syll. Fung. 3: 351.

On *Morus alba.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 28—Los Baños (*Baker 3818*); BAKER, Philip. Agr. & For. 5 (1916) 75; Ann. Myc. 15 (1917) 257; REINKING, Philip. Journ. Sci. 13 (1918) 168; Phytopath. 9 (1919) 128.

DIPLODIA PHASEOLINA Sacc.

On *Phaseolus lunatus.* BAKER, Philip. Agr. & For. 3 (1914) 163; Ann. Myc. 15 (1917) 257.

On *Phaseolus vulgaris.* BAKER, Philip. Agr. & For. 5 (1916) 76—Los Baños; REINKING, Philip. Journ. Sci. 13 (1918) 169; Phytopath. 9 (1919) 132.

DIPLODIA RICINICOLA Sacc.

On *Ricinus communis.* Ann. Myc. 15 (1917) 257.

DIPLODIA SYNEDRELLAE Sacc.

On *Synedrella nodiflora.*

DIPLODINA DEGENERANS Diedicke.

On *Solanum melongena.* BAKER, Philip. Agr. & For. 5 (1916) 77—Los Baños; Ann. Myc. 14 (1916) 64.

HAPLOSPORA MANILENSIS Sacc.

On *Ricinus communis.* Ann. Myc. 15 (1917) 257.

DOTHIORELLA CRASTOPHILA Sacc.

On *Bambusa.* Ann. Myc. 15 (1917) 257.

LASIODIPLODIA THEOBROMAE (Pat.) Griff. and Maubl.

On *Theobroma cacao.* BAKER, Philip. Agr. & For. 3 (1914) 164; 4 (1915) 164; SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 28—Los Baños (*Baker 2729a, 2778*); Philip. Agr. & For. 5 (1916) 77; Ann. Myc. 15 (1917) 258; REINKING, Philip. Journ. Sci. 13 (1918) 169; Phytopath. 9 (1919) 138; Philip. Agr. 8 (1920) 237.

On *Ipomoea batatas.* BAKER, Philip. Agr. & For. 5 (1916) 77—Los Baños.

On *Carica papaya, Citrus maxima,* and *Dioscorea esculenta.* REINKING, Philip. Journ. Sci. 13 (1918) 166.

On *Hevea brasiliensis.* Ann. Myc. 21 (1923) 105.

MACROPHOMA ARENGAE Sacc.

On *Arenga saccharifera.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 27—Los Baños (*Baker 2827*).

MACROPHOMA CYANOPSIDIS Syd.

On *Cyanopsis psoraleoides.* BAKER, Philip. Agr. & For. 3 (1914) 161.

MACROPHOMA MUSAE (Cke.) Berl. and Vogl. (Phoma musae Carpenter.)

On *Musa sapientum.* BAKER, Philip. Agr. & For. 3 (1914) 162; Ann. Myc. 15 (1917) 256; Philip. Agr. Rev. 14 (1921) 425; Phytopath.

12 (1922) 101; Ann. Myc. 21 (1923) 105; Philip. Agr. Rev. 18 (1925) 582; Philip. Agr. 15 (1926) 469.

On *Musa paradisiaca sapientum.* REINKING, Phytopath. 9 (1919) 128.

On *Musa textilis.* REINKING, Philip. Journ. Sci. 13 (1918) 168.

MACROPHOMA OBSOLETA Sacc.

On *Capparis horrida.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 26.

MACROPHOMA TRICHOSANTHIS Syd.

On *Trichosanthes anguina.* BAKER, Philip. Agr. & For. 5 (1916) 77—Los Baños.

On *Cucumis sativus.* Phytopath. 9 (1919) 124.

MICRODIPLODIA PASSERINIANA (Thüm.) Allesch.

SACCARDO, Syll. Fung. 3: 371.

On *Arenga saccharifera.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 28—Los Baños (*Baker 3866*); BAKER, Philip. Agr. & For. 5 (1916) 74.

APHYSA DESMODII Syd. (= Pazschkiella philippinensis Yates.)

On *Desmodium sinuosum.* Ann. Myc. 15 (1917) 205; 20 (1922) 73; 21 (1923) 99; 26 (1928) 435.

On *Dunbaria* sp. Philip. Journ. Sci. 13 (1918) 380.

PHOMA BAKERIANA Sacc.

On *Vigna* spp. Philip. Agr. & For. 4 (1914) 164; REINKING, Philip. Journ. Sci. 13 (1918) 170; Phytopath. 9 (1919) 139.

PHOMA CITRICARPA McAlpine.

On *Citrus* spp. Philip. Journ. Sci. 17 (1920) 640.

PHOMOPSIS CALANTHES Sacc.

On *Calanthes.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 27—Mount Maquiling (*Baker 3824*).

PHOMOPSIS CAPSICI (Magnaghi) Sacc.

SACCARDO, Syll. Fung. 18: 256.

On *Capsicum annuum.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 27—Los Baños (*Baker 3749*); BAKER, Philip. Agr. & For. 5 (1916) 74; REINKING, Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 117.

PHOMOPSIS CINERESCENS (Sacc.) Bubák.

On *Ficus* sp. Ann. Myc. 15 (1917) 256.

PHOMOPSIS DIOSCOREAE Sacc.

On *Dioscorea esculenta.* REINKING, Philip. Journ. Sci. 13 (1918) 167.

PHOMOPSIS GLIRICIDIAE Syd.

On *Gliricidia maculata.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 27—Los Baños (*Baker 3820*).

PHOMOPSIS PALMICOLA (Wint.) Sacc. f. ARECAE Sacc.

On *Areca catechu.* SACCARDO, Ann. Myc. 13 (1915) 128—Los Baños (*Raimundo,* comm. *Baker 2953*); BAKER, Philip. Agr. & For. 5 (1916) 73—Los Baños; REINKING, Philip. Journ. Sci. 13 (1918) 165.

PHOMA HERBARUM Westd.

On *Manihot utilissima.* REINKING, Philip. Journ. Sci. 13 (1918) 168.

PHOMA OLERACEA Sacc.

On *Dioscorea* spp. BAKER, Philip. Agr. & For. 3 (1914) 161; REINKING, Phytopath. 9 (1919) 124.

On *Dioscorea esculenta.* REINKING, Philip. Journ. Sci. 13 (1918) 167.

PHOMA SABDARIFFAE Sacc.

On *Hibiscus sabdariffa.* BAKER, Philip. Agr. & For. 4 (1914) 161; Ann. Myc. 15 (1917) 256; REINKING, Philip. Journ. Sci. 13 (1918) 167; Phytopath. 9 (1919) 126.

PHOMA SESAMINA Sacc.

On *Sesamum orientale* (*S. indicum*). BAKER, Philip. Agr. & For. 3 (1914) 164; REINKING, Philip. Journ. Sci. 13 (1918) 169; Phytopath. 9 (1919) 136.

PHOMA SOLANOPHILA Oud.

SACCARDO, Syll. Fung. 16: 870.

On *Solanum melongena.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 27—Los Baños (*Baker 3825*); REINKING, Philip. Journ. Sci. 13 (1918) 169.

PHELLOSTROMA HYPOXYLOIDES Syd.

On *Areca catechu.* Philip. Agr. & For. 4 (1914) 158; Philip. Journ. Sci. 13 (1918) 165.

PHOMOPSIS ARECAE Syd.

On *Areca catechu.* BAKER, Philip. Journ. Agr. & For. 4 (1914) 158; REINKING, Philip. Journ. Sci. 13 (1918) 165.

PHYLLOSTICTA CIRCUMSEPTA Sacc.

On *Citrus nobilis.* BAKER, Philip. Agr. & For. 3 (1914) 160.

On *Citrus maxima.* REINKING, Philip. Journ. Sci. 13 (1918) 166.

On *Citrus* spp. REINKING, Phytopath. 9 (1919) 120; Philip. Agr. 9 (1920–21) 135.

PHYLLOSTICTA COCOPHYLLA Pass.

On *Cocos nucifera.* REINKING, Philip. Journ. Sci. 13 (1918) 167; Phytopath. 9 (1919) 122.

PHYLLOSTICTA DENSISSIMA Sacc.

On *Capparis horrida.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 26—Los Baños (*Baker 3787a*).

PHYLLOSTICTA DYSOXYLI Sacc.

On *Dysoxylum.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 26—Mount Maquiling (*Baker 3795*).

PHYLLOSTICTA EUCHLAENAE Sacc.

On *Euchlaena luxurians.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 25—Los Baños (*Baker 3734*); BAKER, Philip. Agr. & For. 5 (1916) 75.

PHYLLOSTICTA GLUMARUM Sacc.

On *Oryza sativa.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 25—Los Baños (*Baker 3871*, err. *3371*); BAKER, Philip. Agr. & For. 5 (1916) 75; Ann. Myc. 15 (1917) 256; REINKING, Philip. Journ. Sci. 13 (1918) 168; Phytopath. 9 (1919) 131.

PHYLLOSTICTA GRAFFIANA Sacc.

On *Dioscorea aculeata.* Ann. Myc. 15 (1917) 255.

On *Dioscorea esculenta.* REINKING, Philip. Journ. Sci. 13 (1918) 167, 381.

PHYLLOSTICTA INSULARUM Sacc.

On *Anona muricata.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 26—Los Baños (*Baker 3795*); BAKER, Philip. Agr. & For. 5 (1916) 73; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 115.

PHYLLOSTICTA MANHOTICOLA Syd.

On *Manihot dichotoma.* BAKER, Philip. Agr. & For. 3 (1914) 162; REINKING, Philip. Journ. Sci. 13 (1918) 168; Phytopath. 9 (1919) 127.

PHYLLOSTICTA MIURAI I. Miyake.

SACCARDO, Syll. Fung. 22: 864.

On *Oryza sativa.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 26—Los Baños (*Baker 3811*); BAKER, Philip. Agr. & For. 5 (1916) 75; Philip. Journ. Sci. 13 (1918) 381; REINKING, Philip. Journ. Sci. 13 (1918) 168; Phytopath. 9 (1919) 131.

PLACOSPHAERIA DURIONIS Syd.

On *Durio zibethinus.* BAKER, Philip. Agr. & For. 3 (1914) 161.

PLACOSPHAERIA TIGLII Henn.

On *Croton tiglium.* BAKER, Philip. Agr. & For. 4 (1914) 161; Ann. Myc. 15 (1917) 256; Philip. Journ. Sci. 13 (1918) 381.

RHABDOSPORA SYNEDRELLAE Sacc.

On dead stems of *Synedrella nodiflora.* SACCARDO, Ann. Myc. 13 (1915) 128—Los Baños (*Baker 3228*).

SEPTORIA PALMARUM Sacc.

On *Corypha elata.* BAKER, Philip. Agr. & For. 3 (1914) 160.

SEPTOSPORIELLA PHILIPPINENSIS Sacc.

On *Saccharum spontaneum.* SACCARDO, Syll. Fung. 3 (1916) 29—Los Baños (*Baker 3742*).

STAGONOSPORA VARIANS Sacc.

On *Symplocum whitfordii.* Ann. Myc. 15 (1917) 259.

TRAVERSOA DOTHIORELLOIDES Sacc. and Syd.

On *Morus alba*. BAKER, Philip. Agr. & For. 3 (1914) 162; REINKING, Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 128.

On *Citrus nobilis*. Ann. Myc. 15 (1917) 257.

TRAVERSOA EXCIPULOIDES Sacc.

Ann. Myc. 15 (1917) 257.

TRAVERSOA EXCIPULOIDES Sacc. and Syd. var. DISTANS Sacc. and Syd.

On *Gliricidia sepium*. Ann. Myc. 15 (1917) 257.

VERMICULARIA BREVISETA Sacc.

On *Synedrella nodiflora*. Ann. Myc. 15 (1917) 267.

VERMICULARIA CAPSICI Syd.

On *Capsicum annuum*. REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 117.

VERMICULARIA FALLAX Sacc.

On *Passiflora quadrangularis*. BAKER, Philip. Agr. & For. 3 (1914) 163.

VERMICULARIA HORRIDULA Sacc.

On *Dolichos uniflorus*. BAKER, Philip. Agr. & For. 3 (1914) 161; REINKING, Phytopath. 9 (1919) 132.

On *Dolichos lablab*. REINKING, Philip. Journ. Sci. 13 (1918) 167.

VERMICULARIA MERRILLIANA Sacc.

On *Datura alba*. Ann. Myc. 15 (1917) 267.

VERMICULARIA SESAMINA Sacc.

On *Sesamum orientale* (*S. indicum*). REINKING, Philip. Journ. Sci. 13 (1918) 169; Phytopath. 9 (1919) 136.

VERMICULARIA XANTHOSOMATIS Sacc.

On *Xanthosoma sagittifolium*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 28—Los Baños (*Baker 3750*); BAKER, Philip. Agr. & For. 5 (1916) 78; REINKING, Phytopath. 9 (1919) 139.

YPSILONIA CUSPIDATA Léveille.

On leaves on one of the Anonaceæ. LÉVEILLE, Ann. Sci. Nat. (1846) 284—Manila (*Cuming*); SACCARDO, Syll. Fung. 3 (1884) 216.

On *Cyclostemon* sp. Ann. Myc. 15 (1917) 261.

NECTRIOIDACEÆ

ASCHERSONIA CINNABARINA P. Henn.

On *Astronia*. Ann. Myc. 15 (1917) 261.

ASCHERSONIA CONFLUENS Henn.

HENNINGS, Monsunia 1 (1899) 37; Hedwigia 145 (1902) (*A. phthurioides*); BAKER, Leafl. Philip. Bot. 6 (1914) 2155; PETCH, Ann. Roy. Bot. Gard. Peradeniya 5 (1914) 526 (stage of *Hypocrella mollii* Koord.).

ASCHERSONIA LECANIOIDES P. Henn.

On *Melastoma*. Ann. Myc. 15 (1917) 261.

ASCHERSONIA PARAENSIS Henn.

SACCARDO, Syll. Fung. 18: 413.

On coccids on *Psidium guajava*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 29—Hills back of Paete, Laguna Province (*Baker 3790*); BAKER, Philip. Agr. & For. 5 (1916) 76; REINKING, Phytopath. 9 (1919) 133.

ASCHERSONIA PLACENTA B. and Br.

BERKELEY and BROOME, Journ. Linn. Soc. Bot. 14 (1873) 89; HENNINGS, Engl. Bot. Jahrb. 25 (1898) 509 (*A. novo-guineensis*); PENZIG and SACCARDO, Malpighia (1901) 236 (*A. javanica*); HENNINGS, Hedwigia (1902) 145 (*A. lecanioides*); BAKER, Leafl. Philip. Bot. 6 (1914) 2155 (*A. lecanioides* and *A. novoguineensis*); PETCH, Ann. Roy. Bot. Gard. Peradeniya 5 (1914) 527.

ASCHERSONIA SAMOENSIS Henn.

HENNINGS, Engler's Bot. Jahrb. 23 (1896) 289; Monsunia 1 (1899) 37 (*A. cinnabarina*); PATOUILLARD and HARIOT, Bull. Soc. Myc. Fr. 20 (1904) 65 (*A. napoleonae*); BAKER, Leafl. Philip. Bot. 6 (1914) 2154 (*A. cinnabarina*); PETCH, Ann. Roy. Bot. Gard. Peradeniya 5 (1914) 526 [stage of *Hypocrella discoidea* (B. and Br.) Sacc.].

ASCHERSONIA SCLEROTOIDES Henn.

HENNINGS, Hedwigia (1902) 146; PATOUILLARD, Bull. Soc. Myc. Fr. 22 (1906) 59 (*A. pisiformis*); BAKER, Leafl. Philip. Bot. 7 (1914) 2514; PETCH, Ann. Roy. Bot. Gard. Peradeniya 5 (1914) 525 (stage of *Hypocrella reineckiana* Henn.).

On *Citrus* sp. Ann. Myc. 15 (1917) 261.

On *Citrus maxima*. REINKING, Philip. Journ. Sci. 13 (1918) 165.

On coccids. REINKING, Phytopath. 9 (1919) 119.

LEPTOSTROMATACEÆ

DIEDICKEA SINGULARIS Syd.

On *Polyosma philippinensis*. Ann. Myc. 15 (1917) 260.

On *Polyosma sorsogonensis*. Leafl. Philip. Bot. 9 (1925) 3137.

LASIOTHYRIUM CYCLOSCHIZON Syd.

On *Aegiceras corniculatum*. Philip. Journ. Sci. 12 (1917).

LEPTOTHYRIUM CIRCUMSCISSUM Syd.

On *Mangifera indica*. BAKER, Philip. Agr. & For. 3 (1914) 162; REINKING, Philip. Journ. Sci. 13 (1918) 168; Phytopath. 9 (1919) 127.

MELANCONIALES

MELANCONIACEÆ

COLLETOTRICHUM ARECAE Sydow.

On *Areca catechu*. BAKER, Philip. Agr. & For. 4 (1914) 158; REINKING, Philip. Journ. Sci. 13 (1918) 165.

COLLETOTRICHUM ARECAE Syd. Forma setis perpaucis praedita.

On *Areca catechu.* Ann. Myc. 15 (1917) 262.

COLLETOTRICHUM EUCHROUM Syd.

On *Euphorbia neriifolia.* BAKER, Philip. Agr. & For. 3 (1914) 161.

COLLETOTRICHUM FALCATUM Went.

On *Saccharum officinarum.* Phytopath. 9 (1919) 134; Philip. Agr. Rev. 14 (1921) 431.

COLLETOTRICHUM GLOEOSPORIOIDES Penz.

On *Citrus maxima.* Philip. Journ. Sci. 13 (1918) 166; Philip. Agr. 9 (1920–21) 139; Philip. Agr. Rev. 14 (1921) 424.

COLLETOTRICHUM LUSSONIENSE Sacc.

On *Manihot utilissima.* BAKER, Philip. Agr. & For. 3 (1914) 162; REINKING, Philip. Journ. Sci. 13 (1918) 168; Phytopath. 9 (1919) 128.

COLLETOTRICHUM NIGRUM Ellis and Halsted.

On *Capsicum annuum.* Phytopath. 9 (1919) 117; Philip. Agr. 13 (1924–25) 165; 14 (1925–26) 500.

COLLETOTRICHUM PAPAYAE (Henn.) Syd.

On *Carica papaya.* BAKER, Philip. Agr. & For. 3 (1914) 159; Ann. Myc. 15 (1917) 262; REINKING, Philip. Journ. Sci. 13 (1918) 166; Phytopath. 9 (1919) 118; Ann. Myc. 21 (1923) 105.

GLOEOSPORIUM MACROPHOMOIDES Sacc.

On *Sesamum indicum.* BAKER, Philip. Agr. & For. 3 (1914) 164.

GLOEOSPORIUM AFFINE Sacc.

SACCARDO, Syll. Fung. 3: 709.

On *Hoya.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 29—Los Baños (*Baker 3895*).

GLOEOSPORIUM ALCHORNEAE Syd.

On *Alchornea javanica.* Ann. Myc. 15 (1917) 261.

On *Alchornea rugosa.* Leafl. Philip. Bot. 9 (1925) 3138.

GLOEOSPORIUM ALSTONIAE Sacc.

On *Alstonia scholaris.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 29—Los Baños (*Baker 3739*).

GLOEOSPORIUM CANAVALIAE Syd.

On *Canavalia.* BAKER, Philip. Agr. & For. 3 (1914) 159.

On *Canavalia gladiata.* REINKING, Philip. Journ. Sci. 13 (1918) 166.

On *Phaseolus* spp. REINKING, Phytopath. 9 (1919) 132.

GLOEOSPORIUM CATECHU Syd.

On *Areca catechu.* BAKER, Philip. Agr. & For. 3 (1914) 158; REINKING, Philip. Journ. Sci. 13 (1918) 165.

GLOEOSPORIUM LEBBEK Syd.

On *Albizzia lebbek.* Ann. Myc. 15 (1917) 261.

GLOEOSPORIUM MACROPHOMOIDES Sacc.

On *Sesamum orientale* (*Sesamum indicum*). BAKER, Philip. Agr. & For. 4 (1914) 164; REINKING, Philip. Journ. Sci. 13 (1918) 169; Phytopath. 9 (1919) 136.

On *Dioscorea esculenta*. REINKING, Philip. Journ. Sci. 13 (1918) 166.

GLOEOSPORIUM MUSARUM Cke. and Mass.

On *Musa sapientum*. Philip. Agr. 10 (1922) 419; Philip. Agr. Rev. 18 (1925) 581; Philip. Agr. 13 (1924–25) 340.

GLOEOSPORIUM PALMARUM Oud.

On *Areca catechu*. REINKING, Philip. Journ. Sci. 13 (1918) 165.

GLOEOSPORIUM VANILLAE Cke.

On Orchidaceæ. BAKER, Philip. Agr. & For. 3 (1914) 163.

On *Vanilla* sp. Ann. Myc. 15 (1917) 261.

MARSONIA PAVONINA Syd.

On *Macaranga* sp. Ann. Myc. 15 (1917) 262.

On *Macaranga utilis*. Leafl. Philip. Bot. 9 (1925) 3138.

MELANCONIUM SACCHARI Cooke.

SACCARDO, Syll. Fung. 14: 1019.

On *Saccharum officinarum*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 29—Ube, Mount Banahao (*Baker 4293*, err. *3867*); BAKER, Philip. Agr. & For. 5 (1916) 76, 343; Philip. Agr. Rev. 11 (1918) 276; REINKING, Philip. Journ. Sci. 13 (1918) 169; Phytopath. 9 (1919) 134; Philip. Agr. Rev. 14 (1921) 429.

On *Saccharum spontaneum*. Ann. Myc. 15 (1917) 262.

PESTALOZZIA FUNEREA Desm.

On *Carissa arduina*. BAKER, Philip. Agr. & For. 3 (1914) 162; 5 (1916) 74—Los Baños; SACCARDO, Syll. Fung. 3 (1916) 791; Nuovo Giorn. Bot. Ital. 23 (1916) 29—Los Baños (*Baker 3788, 3894*).

PESTALOZZIA PALMARUM Cke. and Grev.

On *Areca catechu*. BAKER, Philip. Agr. & For. 3 (1914) 160; 5 (1916) 73—Los Baños; SACCARDO, Syll. Fung. 3 (1916) 796; Nuovo Giorn. Bot. Ital. 23 (1916) 30—Los Baños (*Baker 3814*).

On *Cocos nucifera*. Ann. Myc. 15 (1917) 262; REINKING, Phytopath. 9 (1919) 121; Philip. Agr. Rev. 14 (1921) 428; 18 (1925) 591.

PESTALOZZIA PAUCISETA Sacc.

On *Uvaria*. Ann. Myc. 15 (1917) 262.

On *Mangifera indica*. REINKING, Philip. Journ. Sci. 13 (1918) 167.

SEPTOGLOEUM ARACHIDIS Rac.

On *Arachis hypogaea*. REINKING, Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 116.

HYPHALES

MUCEDINACEÆ

ASPERGILLUS DELACRIOIXI Sacc. and Syd.

On *Theobroma cacao.* BAKER, Philip. Agr. & For. 3 (1914) 164; 4 (1915) 165; REINKING, Philip. Journ. Sci. 13 (1918) 169; Phytopath. 9 (1919) 138.

ASPERGILLUS FLAVUS Link.

On fiber of *Musa textilis.* Philip. Journ. Sci. 32 (1927) 79.

ASPERGILLUS PERICONIOIDES Sacc.

On *Carica papaya.* BAKER, Philip. Agr. & For. 3 (1914) 159; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 118.

MYCOGNE CERVINA Ditm. var. THEOBROMAE Sacc.

On *Theobroma cacao.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 30—Los Baños (*Baker 3884*); BAKER, Philip. Agr. & For. 5 (1916) 77; REINKING, Philip. Journ. Sci. 13 (1918) 169; Phytopath. 9 (1919) 138.

OIDIUM ERYSIPHOIDES Fr.

On *Heliotropus indicus.* Ann. Myc. 15 (1917) 263.

OOSPORA CANDIDULA Sacc.

SACCARDO, Syll. Fung. 4: 12.

On *Theobroma cacao.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 30—Los Baños (*Baker 3729b*); BAKER, Philip. Agr. & For. 5 (1916) 77; REINKING, Philip. Journ. Sci. 13 (1918) 245; Phytopath. 9 (1919) 138.

OOSPORA HYALINULA Sacc. var. SORDIDULA Sacc.

On *Capparis horrida.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 30—Los Baños (*Baker 3787d*, err. *3887*).

OOSPORA ORYZETORUM Sacc.

On *Oryza sativa.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 30—Los Baños (*Baker 3867*); BAKER, Philip. Agr. & For. 5 (1916) 75; REINKING, Philip. Journ. Sci. 13 (1918) 228; Phytopath. 9 (1919) 131.

RAMULARIA CATAPPAE Rac.

On *Terminalia catappa.* BAKER, Philip. Agr. & For. 3 (1914) 164; REINKING, Phytopath. 9 (1919) 138.

DEMATIACEÆ

CERCOSPORA ACEROSUM Dickh. and Hein.

On *Saccharum officinarum.* BAKER, Philip. Agr. & For. 4 (1914) 164.

CERCOSPORA APII Fres.

On *Apium graveolens.* Ann. Myc. 15 (1917) 264; Philip. Journ. Sci. 13 (1918) 165; Philip. Agr. 10 (1922) 349.

CERCOSPORA ARMORACIAE Sacc.

On *Brassica* spp. BAKER, Philip. Agr. & For. 3 (1914) 159.
On *Brassica pekinensis*. REINKING, Philip. Journ. Sci. 13 (1918) 165.
On *Brassica chinensis*. REINKING, Phytopath. 9 (1919) 117.

CERCOSPORA ARTOCARPI Syd.

On *Artocarpus incisa*. BAKER, Philip. Agr. & For. 3 (1914) 158; REINKING, Phytopath. 9 (1919) 116.
On *Artocarpus communis*. REINKING, Philip. Journ. Sci. 13 (1918) 178.

CERCOSPORA OVERRHOI Welles.

On *Averrhoa carambola*. WELLES, Philip. Journ. Sci. 19 (1921) 749.

CERCOSPORA BAUHINIAE Syd.

On *Bauhinia malabarica*. Ann. Myc. 15 (1917) 264.

CERCOSPORA BETICOLA Sacc.

On *Beta vulgaris*. Phytopath. 9 (1919) 116; Philip. Agr. 10 (1922) 349.

CERCOSPORA BRASSICOLA Henn.

On *Brassica sinensis*. HENNINGS, Engl. Jahrb. 37 (1905) 166—Japan; SACCARDO and TROTTER, Syll. Fung. 22 (1913) 1413; Ann. Myc. 15 (1917) 264; REINKING, Phytopath. 9 (1919) 117.
On *Brassica pekinensis*. REINKING, Philip. Journ. Sci. 13 (1918) 165.

CERCOSPORA CANAVALIAE Syd.

On *Canavalia gladiata*. BAKER, Philip. Agr. & For. 3 (1914) 159; REINKING, Philip. Journ. Sci. 13 (1918) 165.
On *Phaseolus* sp. REINKING, Phytopath. 9 (1919) 132.

CERCOSPORA COFFEICOLA Berk. and Cooke.

On *Coffea* spp. WELLES, Philip. Journ. Sci. 19 (1921) 743.

CERCOSPORA CRUENTA Sacc.

On *Phaseolus aureus*. WELLES, Phytopath. 14 (1924) 357.

CERCOSPORA DUDDIAE Welles.

On *Allium sativum* and *A. cepa*. WELLES, Phytopath. 13 (1923) 364.

CERCOSPORA GLIRICIDIAE Syd.

On *Gliricidia sepium*. Ann. Myc. 15 (1917) 264; Philip. Journ. Sci. 12 (1917) 380; 13 (1918) 382.

CERCOSPORA HENNINGSII Allesch.

On *Manihot utilissima*. BAKER, Philip. Agr. & For. 4 (1914) 162; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 128.

CERCOSPORA LACTUCAE Stevenson. (Cercospora lactucae Welles.)

On *Lactuca sativa*. WELLES, Phytopath. 13 (1923) 289.

CERCOSPORA LITSEAE-GLUTINOSAE Syd.

On *Litsea glutinosa*. Ann. Myc. 15 (1917) 264.

CERCOSPORA LUSSONIENSE Sacc.

On *Phaseolus lunatus*. BAKER, Philip. Agr. & For. 3 (1914) 163.

On *Phaseolus* spp. REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 132.

CERCOSPORA MANGIFERAE Koord.

On *Mangifera indica*. BAKER, Philip. Agr. & For. 3 (1914) 162; Ann. Myc. 15 (1917) 264; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 127.

CERCOSPORA MANIHOTIS P. Henn.

On *Manihot utilissima*. Ann. Myc. 15 (1917) 265; REINKING, Philip. Journ. Sci. 13 (1918) 165; Ann. Myc. 21 (1923) 106.

CERCOSPORA MELONGENAE Welles.

On *Solanum melongena*. WELLES, Phytopath. 12 (1922) 63.

CERCOSPORA NICOTIANAE Ell. and Evht.

On *Nicotiana tabacum*. BAKER, Philip. Agr. & For. 3 (1914) 162; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 117; Ann. Myc. 21 (1923) 106; Philip. Agr. Rev. 18 (1925) 570; Philip. Agr. 15 (1926) 300.

CERCOSPORA OCCIDENTALIS Cke. var. CASSIOCARPA Sacc.

On *Cassia occidentale*. Ann. Myc. 15 (1917) 265.

CERCOSPORA PACHYDERMA Syd.

On *Dioscorea* spp. BAKER, Philip. Agr. & For. 4 (1914) 161; REINKING, Phytopath. 9 (1919) 124.

On *Dioscorea alata*. Ann. Myc. 15 (1917) 265.

On *Dioscorea esculenta*. REINKING, Philip. Journ. Sci. 13 (1918) 165.

CERCOSPORA PAHUDIAE Syd.

On *Pahudia romboidea*. BAKER, Philip. Agr. & For. 3 (1914) 163.

CERCOSPORA PANTOLEUCA Syd.

On *Clitoria ternatea*. BAKER, Philip. Agr. & For. 3 (1914) 160.

CERCOSPORA PERSONATA (B. and C.) Ell.

On *Arachis hypogaea*. BAKER, Philip. Agr. & For. 3 (1914) 158; Ann. Myc. 15 (1917) 265; Philip. Journ. Sci. 12 (1917) 380; REINKING, Phytopath. 9 (1919) 115.

CERCOSPORA PUERARIAE Syd.

On *Pueraria* sp. Ann. Myc. 15 (1917) 265.

CERCOSPORA SESAMI A. Zimm.

On *Sesamum orientale* (*S. indicum*). BAKER, Philip. Agr. & For. 3 (1914) 164; Philip. Agr. & For. 6 (1917) 294; Ann. Myc. 15 (1917) 265; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 136.

CERCOSPORA STIZOLOBII Syd.

On *Mucuna deeringiana* (*Stizolobium deeringianum*). BAKER, Philip. Agr. & For. 3 (1914) 164; REINKING, Philip. Journ. Sci. 13 (1918) 165.

On *Stizolobium niveum*. REINKING, Phytopath. 9 (1919) 132.

CERCOSPORA SUBSESSILIS Syd.

On *Melia azedarach*. Ann. Myc. 15 (1917) 265.

CERCOSPORA TIGLII Henn.

On *Croton tiglium*. BAKER, Philip. Agr. & For. 4 (1914) 161.

CERCOSPORA UBI Rac.

On *Dioscorea* spp. BAKER, Philip. Agr. & For. 3 (1914) 161; REINKING, Phytopath. 9 (1919) 124.

On *Dioscorea esculenta*. REINKING, Philip. Journ. Sci. 13 (1918) 165.

ALTERNARIA BRASSICAE (Berk.) Sacc.

On *Brassica culta*. Ann. Myc. 15 (1917) 266.

CERCOSPORINA CARTHAMI Syd.

On *Carthamus tinctorium*. BAKER, Philip. Agr. & For. 3 (1914) 159.

CLADOSPORIUM HERBARUM L.

On *Phaseolus lunatus*. BAKER, Philip. Agr. & For. 3 (1914) 163; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 132.

CLADOSPORIUM LINEOLATUM Sacc.

On *Capparis micracantha*. Ann. Myc. 15 (1917) 264.

CLASTEROSPORIUM MAYDICUM Sacc.

On *Zea mays*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 31—Los Baños (*Baker 3733a*); BAKER, Philip. Agr. & For. 5 (1916) 78; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 140.

CONIOSPORIUM BAMBUSAE (Thuem. and Bolle) Sacc.

On *Bambusa* sp. Ann. Myc. 15 (1917) 263.

On *Bambusa longinodis*. Ann. Myc. 21 (1923) 105.

CONIOSPORIUM EXTREMORUM Syd.

On *Saccharum officinarum*. BAKER, Philip. Agr. & For. 3 (1914) 164; 5 (1916) 343; Philip. Agr. Rev. 11 (1918) 276; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 136.

CONIOSPORIUM ORYZINUM Sacc.

On *Oryza sativa*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 31—Los Baños (*Baker 3773*); BAKER, Philip. Agr. & For. 5 (1916) 76; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 131.

CONIOSPORIUM UNILATERALE Sacc. and Peyr.

On *Schizostachyum* sp. Ann. Myc. 15 (1917) 263.

CONIOSPORIUM VINOSUM (B. and C.) Sacc.

On *Saccharum officinarum*. BAKER, Philip. Agr. & For. 3 (1914) 164; 5 (1916) 343; REINKING, Philip. Journ. Sci. 13 (1918) 165; Philip. Agr. Rev. 11 (1918) 276; Phytopath. 9 (1919) 136.

DICHOTOMELLA AREOLATA Sacc.

On *Artocarpus integra* (*A. integrifolia*). BAKER, Philip. Agr. & For. 3 (1914) 158; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1916) 116.

HELMINTHOSPORIUM CARYOPSIDUM Sacc.

On *Andropogon sorghum* (*Sorghum vulgare, Holcus sorghum*). BAKER. Philip. Agr. & For. 3 (1914) 164; SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 32—Los Baños (*Baker 3754, 3808, 3812*); BAKER, Philip. Agr. & For. 5 (1916) 77; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 137.

HELMINTHOSPORIUM CURVULUM Sacc.

On *Zea mays*. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 32—Los Baños (*Baker 3733b*); BAKER, Philip. Agr. & For. 5 (1916) 78; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 140.

HELMINTHOSPORIUM FICINUM Sacc. (Helminthosporium ficinum Yates.)

On *Ficus caudatifolia*. Philip. Journ. Sci. 13 (1918) 382; Ann. Myc. 20 (1922) 73.

On *Ficus*. Ann. Myc. 21 (1923) 105; Leafl. Philip. Bot. 9 (1925) 3138.

HELMINTHOSPORIUM INCONSPICUUM C. and Ell.

On *Zea mays*. Philip. Agr. Rev. 4 (1911) 357; BAKER, Philip. Agr. & For. 3 (1914) 164; Ann. Myc. 15 (1917) 265; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 140; Philip. Agr. 12 (1923–24) 457; Philip. Agr. Rev. 18 (1925) 571; Philip. Agr. 15 (1925) 127.

HELMINTHOSPORIUM INVERSUM Sacc.

On *Erythrina indica*. Ann. Myc. 15 (1917) 265.

HELMINTHOSPORIUM ORYZAE Breda de Haan.

On *Oryza sativa*. OCFEMIA, Phytopath. 12 (1922) 34; Am. Journ. Bot. 11 (1924) 437.

HELMINTHOSPORIUM PAPAYAE Syd.

On *Carica papaya*. SYDOW, Ann. Myc. 21 (1923) 105.

HELMINTHOSPORIUM RAVENELII Berk. and Curt.

On *Sporobolus elongatus*. Ann. Myc. 15 (1917) 266; 21 (1923) 105.

On *Panicum auritum*. Philip. Journ. Sci. 13 (1918) 383.

On *Sporobolus* sp. Leafl. Philip. Bot. 9 (1925) 3138.

HADRONEMA ORBICULARE Sydow.

On *Quercus* sp. Philip. Journ. Sci. 12 (1917) 380; 13 (1918) 382.

PERICONIA PHILIPPINENSIS Sacc.

On Panicum. SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 32—Los Baños (*Baker 3766*).

SARCINELLA RAIMUNDOI Sacc.

On *Solanum melongena*. BAKER, Philip. Agr. & For. 3 (1914) 164; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 136.

SEPTONEMA PHILIPPINUM Sacc.

On *Imperata cylindrica.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 32—Los Baños (*Baker 3769*).

SPORODESMIUM BAKERI Syd.

On *Musa sapientum.* BAKER, Philip. Agr. & For. 3 (1914) 162; REINKING, Philip. Journ. Sci. 13 (1918) 165.

On *Musa paradisiaca sapientum.* REINKING, Phytopath. 9 (1919) 129.

TORULA DICHROA Sacc.

On *Saccharum spontaneum.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 31—Los Baños (*Baker 3737*).

TORULA HERBARUM Link.

SACCARDO, Syll. Fung. 4: 256.

On *Capparis horrida.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 30—Los Baños (*Baker 3787c*).

TORULA HERBARUM Lk. f. QUATERNELLA Sacc.

On *Thunbergia grandiflora.* Ann. Myc. 15 (1917) 263.

TRICHOSPORIUM COCCIDICOLA Sacc.

On *Phenacuspis mischocarpi* and *Mischocarpus fuscescens.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 31—Mount Maquiling (*Baker 3859*).

STIGMELLA MANILENSIS Sacc.

On *Allophyllum dimorphum.* Ann. Myc. 15 (1917) 268.

ZYGOSPORIUM OSCHEOIDES Mont.

On *Areca catechu.* REINKING, Philip. Journ. Sci. 13 (1918) 165.

TUBERCULARIACEÆ

DENDRODOCHIUM LUSSONENSE Sacc.

Ann. Myc. 15 (1917) 267.

EXOSPORIUM DURUM Sacc.

On *Cocos nucifera.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 33—Ube, Mount Banahao (*Baker 3864*); BAKER, Philip. Agr. & For. 5 (1916) 74—Mount Banahao; REINKING, Philip. Journ. Sci. 13 (1918) 165; REINKING, Phytopath. 9 (1919) 121; Philip. Agr. Rev. 18 (1925) 591.

EXOSPORIUM PULCHELLUM Sacc.

On *Areca catechu.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 33—Los Baños (*Baker 3753, 3799*); BAKER, Philip. Agr. & For. 5 (1916) 73—Los Baños; REINKING, Philip. Journ. Sci. 13 (1918) 165.

On *Orania palindan.* Ann. Myc. 15 (1917) 266.

FUSARIUM CUBENSE Efs.

On *Musa sapientum.* Philip. Agr. Rev. 13 (1920) 128; Phytopath. 10 (1920) 504.

On *Musa textilis.* Philip. Agr. Rev. 16 (1923) 106; LEE and SERRANO, Phytopath. 13 (1923) 354; Philip. Agr. 19 (1930) 27.

FUSARIUM THEOBROMAE App. and Strunk.

SACCARDO, Syll. Fung. 18: 672.

On *Theobroma cacao.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 33—Los Baños (*Baker 3885*); REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 138.

HYMENOPSIS CUDRANIAE Mass.

On *Cudrania javanica.* Philip. Journ. Sci. 13 (1918) 384.

HYMENULA COPELANDI Sacc.

On *Diospyrus* sp. Ann. Myc. 15 (1917) 267.

ILLOSPORIUM TABACINUM Sacc.

On *Macaranga.* SACCARDO, Ann. Myc. 13 (1915) 128—Los Baños (*Baker 3322*).

PIONNOTES CAPILLACEA Sacc.

On *Persea americana* and *P. gratissima.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 34—Los Baños (*Baker 3816*); BAKER, Philip. Agr. & For. 5 (1916) 76.

SPEGAZZINIA MELIOLAE A. Zimm.

On *Meliola callicarpae.* Philip. Journ. Sci. 12 (1916) 363; Ann. Myc. 15 (1917) 268.

SPEGAZZINIA ORNATA Sacc.

SACCARDO, Syll. Fung. 4 (1917) 758.

On *Oryza sativa.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 32—Los Baños (*Baker 3772, 3770, 3803*); BAKER, Philip. Agr. & For. 5 (1916) 76—Los Baños; REINKING, Philip. Journ. Sci. 13 (1918) 165; Phytopath. 9 (1919) 131.

GRAPHIOLA ARENGAE Rac.

On *Arenga ambong.* Ann. Myc. 15 (1917) 178.

GRAPHIOLA CYLINDROSPORA Syd.

On *Livistonia.* Philip. Agr. & For. 5 (1916) 74.

MYCELIA STERILIA

OZONIUM GLUMICOLA Sacc.

On *Schizostachum acutiflorum.* SACCARDO, Nuovo Giorn. Bot. Ital. 23 (1916) 34—Mount Maquiling (*Baker 3813*).

SCLEROTIUM ROLFSII Sacc.

On *Nicotiana tabacum.* Philip. Agr. Rev. 14 (1921) 427; Philip. Agr. 15 (1926) 290.

On *Lycopersicum esculentum* and *Capsicum annuum.* Philip. Agr. 13 (1924–25) 166; 15 (1926) 580.

On seedlings. Philip. Agr. Rev. 18 (1925) 564.

On *Oryza sativa.* Philip. Agr. 15 (1926) 362; Philip. Agr. Rev. 19 (1926) 238.